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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS
AND
SPECIAL PROVISIONS

FOR CONSTRUCTION ON STATE HIGHWAY IN
LOS ANGELES COUNTY IN EL MONTE AND BALDWIN PARK FROM BALDWIN AVENUE
UNDERCROSSING TO ROUTE 605/10 SEPARATION

DISTRICT 07, ROUTE 10

For Use in Connection with Standard Specifications Dated JULY 1992 and Labor Surcharge
and Equipment Rental Rates.

CONTRACT NO. 07-1069U4
07-LA-10-28.0/31.2

Federal Aid Project

***ACNHI-010-1(762)27N**

Bids Open: November 1, 2001

Dated: September 4, 2001

**QC/QA
OSD**

IMPORTANT SPECIAL NOTICES

- The bidder's attention is directed to Section 5, containing specifications for "Disputes Review Board," of the Special Provisions, regarding establishing a Disputes Review Board (DRB) for the project.
- The Special Provisions for Federal-aid projects (with and without DBE goals) have been revised to incorporate changes made by new regulations governing the DBE Program (49 CFR Part 26).

Sections 2 and 5 incorporate the changes. Bidders should read these sections to become familiar with them. Attention is directed to the following significant changes:

Section 2, "Disadvantaged Business Enterprise (DBE)" revises the counting of participation by DBE primes, and the counting of trucking performed by DBE firms. The section also revises the information that must be submitted to the Department in order to receive credit for trucking.

Section 2, "Submission of DBE Information" revises the information required to be submitted to the Department to receive credit toward the DBE goal. It also revises the criteria to demonstrate good faith efforts.

Section 5, "Subcontractor and DBE Records" revises the information required to be reported at the end of the project, and information related to trucking that must be submitted throughout the project.

Section 5, "DBE Certification Status" adds new reporting requirements related to DBE certification.

Section 5, "Subcontracting" describes the efforts that must be made in the event a DBE subcontractor is terminated or fails to complete its work for any reason.

Section 5, "Prompt Progress Payment to Subcontractors" requires prompt payment to all subcontractors.

Section 5, "Prompt Payment of Withheld Funds to Subcontractors" requires the prompt payment of retention to all subcontractors.

- **Payment Bonds**

Attention is directed to Section 5 of the Special Provisions, regarding contract bonds. The payment bond shall be in a sum not less than one hundred percent of the total amount payable by the terms of the contract.

- Attention is directed to Section 11-2, "Portland Cement Concrete," of these Special Provisions which contains Section 90, "Portland Cement Concrete," of the Standard Specifications.
- Attention is directed to "Miscellaneous Metal," in Section 8-1, "Miscellaneous," of these Special Provisions for new requirements for miscellaneous metal.
- The specifications for this project include Quality Control / Quality Assurance provisions for the contract item "Asphalt Concrete" in the Special Provisions. Asphalt concrete shall conform to the provisions in Section 11-1, "Quality Control / Quality Assurance," and the section entitled "Asphalt Concrete" in Section 10-1, "General," of the Special Provisions. Section 39, "Asphalt Concrete," of the Standard Specifications shall not apply to Type A and Type B asphalt concrete.

TABLE OF CONTENTS

NOTICE TO CONTRACTORS.....	1
COPY OF ENGINEER'S ESTIMATE	3
SPECIAL PROVISIONS	19
SECTION 1. SPECIFICATIONS AND PLANS.....	19
SECTION 2. PROPOSAL REQUIREMENTS AND CONDITIONS.....	19
2-1.01 GENERAL.....	19
2-1.015 FEDERAL LOBBYING RESTRICTIONS.....	19
2-1.02 DISADVANTAGED BUSINESS ENTERPRISE (DBE).....	20
2-1.02A DBE GOAL FOR THIS PROJECT.....	21
2-1.02B SUBMISSION OF DBE INFORMATION	22
SECTION 3. AWARD AND EXECUTION OF CONTRACT.....	23
SECTION 4. BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES	23
SECTION 5. GENERAL	24
SECTION 5-1. MISCELLANEOUS	24
5-1.00 PLANS AND WORKING DRAWINGS	24
5-1.002 LABORATORY	24
5-1.003 EXAMINATION OF PLANS, SPECIFICATIONS, CONTRACT, AND SITE OF WORK	24
5-1.004 DIFFERING SITE CONDITIONS.....	24
5-1.005 CONTRACT BONDS	25
5-1.006 EXCAVATION SAFETY PLANS	25
5-1.007 COST REDUCTION INCENTIVE.....	25
5-1.01 LABOR NONDISCRIMINATION.....	25
5-1.02 LABOR CODE REQUIREMENTS	26
5-1.03 CONTRACTOR'S LICENSING LAWS.....	28
5-1.035 INDEMNIFICATION AND INSURANCE.....	28
5-1.04 ARBITRATION	31
5-1.05 NOTICE OF POTENTIAL CLAIM.....	31
5-1.06 PARTIAL PAYMENTS.....	32
5-1.07 PAYMENT OF WITHHELD FUNDS.....	32
5-1.08 FINAL PAYMENT AND CLAIMS.....	32
5-1.09 INTEREST ON PAYMENTS	34
5-1.10 PUBLIC SAFETY	34
5-1.11 SURFACE MINING AND RECLAMATION ACT.....	35
5-1.12 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES.....	36
5-1.13 FINAL PAY QUANTITIES.....	36
5-1.14 YEAR 2000 COMPLIANCE.....	36
5-1.145 BUY AMERICA REQUIREMENTS.....	36
5-1.15 SUBCONTRACTOR AND DBE RECORDS	37
5-1.152 DBE CERTIFICATION STATUS	37
5-1.155 PERFORMANCE OF DBE SUBCONTRACTORS AND SUPPLIERS	37
5-1.16 SUBCONTRACTING.....	38
5-1.162 PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS	39
5-1.164 PROMPT PAYMENT OF WITHHELD FUNDS TO SUBCONTRACTORS	39
5-1.17 PARTNERING	39
5-1.174 VALUE ANALYSIS	39
5-1.18 DISPUTES REVIEW BOARD	40
5-1.19 FORCE ACCOUNT PAYMENT.....	50
5-1.20 CLAIMS SUBMITTAL	50
5-1.21 COMPENSATION ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS.....	51
5-1.22 AREAS FOR CONTRACTOR'S USE.....	52
5-1.23 PAYMENTS.....	52
5-1.24 SOUND CONTROL REQUIREMENTS.....	53
5-1.25 RELATIONS WITH CALIFORNIA DEPARTMENT OF FISH AND GAME.....	53
5-1.26 RELATIONS WITH CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD	54

5-1.27 RELATIONS WITH U.S. ARMY CORPS OF ENGINEERS	54
5-1.28 RELATIONS WITH THE LOS ANGELES COUNTY FLOOD CONTROL DISTRICT	55
5-1.29 AERIALY DEPOSITED LEAD	55
5-1.30 DEFINITIONS AND TERMS.....	56
Engineer	56
Office of Structure Design	56
5-1.31 PROPOSAL FORMS	56
5-1.32 PROPOSAL REQUIREMENTS AND CONDITIONS	56
Withdrawal of Proposals.....	56
5-1.33 CONTROL OF WORK	57
5-1.34 LEGAL RELATIONS AND RESPONSIBILITY	57
Hours of Labor	57
5-1.35 PROSECUTION AND PROGRESS	60
Subcontracting	60
5-1.36 MEASUREMENT AND PAYMENT	60
Measurement of Quantities	60
SECTION 6. (BLANK).....	61
SECTION 7. (BLANK).....	61
SECTION 8. MATERIALS	61
SECTION 8-1. MISCELLANEOUS	61
8-1.01 PREQUALIFIED AND TESTED SIGNING AND DELINEATION MATERIALS	61
8-1.02 STATE-FURNISHED MATERIALS	66
8-1.03 SLAG AGGREGATE.....	67
8-1.04 MISCELLANEOUS METAL	67
8-1.05 ENGINEERING FABRICS.....	69
8-1.06 PAINT.....	70
8-1.07 LIQUID ASPHALTS	71
8-1.08 EPOXY	71
SECTION 8-2. CONCRETE.....	71
8-2.01 PORTLAND CEMENT CONCRETE.....	71
8-2.02 CEMENT AND WATER CONTENT	73
SECTION 8-3. WELDING	73
8-3.01 WELDING.....	73
GENERAL	73
WELDING QUALITY CONTROL	74
PAYMENT	77
SECTION 9. DESCRIPTION OF BRIDGE WORK.....	77
SECTION 10. CONSTRUCTION DETAILS.....	79
SECTION 10-1. GENERAL	79
10-1.01 CONSTRUCTION PROJECT FUNDING IDENTIFICATION.....	79
10-1.02 ORDER OF WORK.....	80
10-1.03 WATER POLLUTION CONTROL (STORM WATER POLLUTION PREVENTION PLAN)	81
STORM WATER POLLUTION PREVENTION PLAN PREPARATION, APPROVAL AND AMENDMENTS	82
COST BREAK-DOWN	83
SWPPP IMPLEMENTATION	86
MAINTENANCE	86
PAYMENT	87
10-1.04 TEMPORARY FENCES	88
10-1.05 PRESERVATION OF PROPERTY	89
10-1.06 RELIEF FROM MAINTENANCE AND RESPONSIBILITY.....	89
10-1.07 COOPERATION	89
10-1.08 EMISSIONS REDUCTION INCENTIVE PROGRAM	90
10-1.09 PROGRESS SCHEDULE (CRITICAL PATH METHOD).....	91
DEFINITIONS.....	92
GENERAL REQUIREMENTS	92
COMPUTER SOFTWARE	93
NETWORK DIAGRAMS, REPORTS AND DATA.....	94

PRE-CONSTRUCTION SCHEDULING CONFERENCE	95
BASELINE SCHEDULE	95
UPDATE SCHEDULE	96
TIME IMPACT ANALYSIS	96
FINAL UPDATE SCHEDULE	96
RETENTION	96
PAYMENT	97
10-1.10 OVERHEAD	97
10-1.11 OBSTRUCTIONS	99
10-1.12 DUST CONTROL	101
10-1.13 MOBILIZATION	101
10-1.14 CONSTRUCTION AREA TRAFFIC CONTROL DEVICES	101
10-1.15 CONSTRUCTION AREA SIGNS	102
10-1.16 MAINTAINING TRAFFIC.....	103
10-1.17 CLOSURE REQUIREMENTS AND CONDITIONS	122
CLOSURE SCHEDULE	122
CONTINGENCY PLAN	123
LATE REOPENING OF CLOSURES	123
COMPENSATION	123
10-1.18 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE.....	123
10-1.19 PORTABLE FLASHING BEACONS	125
10-1.20 BARRICADE	126
10-1.21 PORTABLE CHANGEABLE MESSAGE SIGN.....	126
10-1.22 TEMPORARY RAILING	126
10-1.23 CHANNELIZER	127
10-1.24 TEMPORARY TRAFFIC SCREEN.....	127
10-1.25 TEMPORARY CRASH CUSHION (REACT).....	127
10-1.26 TEMPORARY CRASH CUSHION MODULE.....	128
10-1.27 EXISTING HIGHWAY FACILITIES	130
10-1.27A ABANDON CULVERT.....	133
10-1.27B ABANDON INLET	134
10-1.27C REMOVE METAL BEAM GUARD RAILING.....	134
10-1.27D REMOVE CHAIN LINK FENCE.....	134
10-1.27E RESET PROPERTY FENCE	134
10-1.27F REMOVE SIGN STRUCTURE	134
10-1.27G REMOVE PAVEMENT MARKER.....	135
10-1.27H REMOVE TRAFFIC STRIPE.....	135
10-1.27I REMOVE DRAINAGE FACILITIES	136
10-1.27J ABANDON DRAINAGE FACILITIES	136
10-1.27K REMOVE ROADSIDE SIGN.....	136
10-1.27L REMOVE RETAINING WALL.....	136
10-1.27M REMOVE SOUND WALL	137
10-1.27N RECONSTRUCT ELECTROLIERS	137
10-1.27O RECONSTRUCT CHAIN LINK FENCE.....	137
10-1.27P RECONSTRUCT METAL BEAM GUARD RAILING	138
10-1.27Q RESET ROADSIDE SIGNS	138
10-1.27R RELOCATE SIGN PANEL (BRIDGE-MOUNTED).....	138
10-1.27S RELOCATE ROADSIDE SIGNS	138
10-1.27T ADJUST INLET	138
10-1.27U REMOVE PORTLAND CEMENT CONCRETE PAVEMENT.....	138
10-1.27V COLD PLANE ASPHALT CONCRETE PAVEMENT.....	139
10-1.27W CAP INLET	139
10-1.27X BRIDGE REMOVAL.....	140
10-1.27Y RECONSTRUCT PEDESTRIAN BARRIER.....	143
10-1.27Z ACCESS OPENING, SOFFIT.....	143
10-1.27AA REMOVE CONCRETE	144
10-1.27BB REMOVE AND REPLACE CONCRETE (CHANNEL).....	144
10-1.27CC JACKING SUPERSTRUCTURE	144
10-1.27DD TEMPORARY SUPPORTS.....	145

10-1.27EE REMOVE ASPHALT CONCRETE SURFACING.....	148
10-1.28 CLEARING AND GRUBBING.....	148
10-1.29 EARTHWORK.....	148
10-1.30 MATERIAL CONTAINING AERIALY DEPOSITED LEAD	149
LEAD COMPLIANCE PLAN	150
EXCAVATION AND TRANSPORTATION PLAN	150
DUST CONTROL	151
MATERIAL TRANSPORTATION	151
DISPOSAL	151
MEASUREMENT AND PAYMENT	151
10-1.31 CONTROLLED LOW STRENGTH MATERIAL	153
10-1.32 PREPARE SUBGRADE AND SUBBALLAST (RAILROAD SHOOFLY)	154
10-1.33 IRRIGATION CROSSEOVERS	155
10-1.34 WATER SUPPLY LINE (BRIDGE).....	155
10-1.35 AGGREGATE BASES.....	157
10-1.36 LEAN CONCRETE BASE	159
10-1.37 ASPHALT CONCRETE	159
10-1.38 ASPHALT CONCRETE (MISCELLANEOUS AREAS)	161
10-1.39 ASPHALT CONCRETE (BRIDGE).....	161
10-1.40 CONCRETE PAVEMENT (UNDOWELED TRANSVERSE WEAKENED PLANE JOINTS).....	161
GENERAL	161
MATERIALS.....	161
SUBMITTALS	162
INSTALLING TIE BARS	162
LIQUID JOINT SEALANT INSTALLATION	163
CONSTRUCTING TRANSVERSE CONTACT JOINTS.....	164
MEASUREMENT AND PAYMENT	164
10-1.41 PILING	164
STEEL PIPE PILING	168
10-1.42 PRESTRESSING CONCRETE.....	174
10-1.43 CONCRETE STRUCTURES.....	177
Timber:.....	185
Steel:	185
Manufactured Assemblies:.....	185
Welding and Nondestructive Testing.....	186
SLIP FORM METHOD FOR CONSTRUCTING RETAINING WALLS.....	191
10-1.44 POLYESTER CONCRETE EXPANSION DAM.....	193
10-1.45 PRECAST PRESTRESSED CONCRETE BRIDGE MEMBERS	197
10-1.46 CLOSURE WALLS	198
10-1.47 STRUCTURE APPROACH SLABS (TYPE N)	198
10-1.48 STRUCTURE APPROACH SLABS (TYPE R)	201
10-1.49 STRUCTURE TRANSITION SLAB	204
10-1.50 PAVING NOTCH EXTENSION	205
10-1.51 SOUND WALL	205
10-1.52 DRILL AND BOND DOWEL (EPOXY CARTRIDGE)	208
10-1.53 DRILL AND BOND DOWELS	208
10-1.54 DRILL AND PRESSURE GROUT DOWELS	209
10-1.55 CORE CONCRETE.....	209
10-1.56 DIAPHRAGM BOLSTER	210
10-1.57 SEALING JOINTS	212
10-1.58 REFINISHING BRIDGE DECKS	213
10-1.59 REINFORCEMENT	215
10-1.60 EPOXY-COATED REINFORCEMENT	224
10-1.61 SHOTCRETE	225
10-1.62 ASPHALT MEMBRANE WATERPROOFING	226
10-1.63 STEEL STRUCTURES.....	227
10-1.64 COLUMN CASINGS	237
10-1.65 SIGN STRUCTURES.....	241
10-1.66 ROADSIDE SIGNS.....	243

10-1.67	INSTALL SIGN OVERLAY	243
10-1.68	CLEAN AND PAINT STRUCTURAL STEEL	244
10-1.69	REINFORCED CONCRETE PIPE.....	248
10-1.70	CORRUGATED METAL PIPE.....	248
10-1.71	EDGE DRAINS.....	249
10-1.72	UNDERDRAINS.....	249
10-1.73	DRAINAGE SYSTEM (BRIDGE)	250
10-1.74	OVERSIDE DRAINS.....	250
10-1.75	MISCELLANEOUS FACILITIES.....	250
10-1.76	SLOPE PROTECTION	251
10-1.77	MISCELLANEOUS CONCRETE CONSTRUCTION.....	251
10-1.78	MISCELLANEOUS IRON AND STEEL.....	251
10-1.79	MISCELLANEOUS METAL (BRIDGE).....	253
10-1.80	MISCELLANEOUS METAL (RESTRAINER-CABLE TYPE).....	253
10-1.81	MISCELLANEOUS METAL (RESTRAINER-PIPE TYPE)	254
10-1.82	MODIFY RESTRAINER.....	254
10-1.83	CONFINEMENT ASSEMBLY	255
10-1.84	CHAIN LINK FENCE.....	255
10-1.85	CHAIN LINK WALK GATES	255
10-1.86	MARKERS AND DELINEATORS.....	256
10-1.87	INSTALL MEDIAN MILEAGE PANELS.....	256
10-1.88	METAL BEAM GUARD RAILING	257
10-1.89	CHAIN LINK RAILING.....	259
10-1.90	CABLE RAILING.....	259
10-1.91	CONCRETE BARRIER	259
10-1.92	CRASH CUSHION (REACT).....	261
10-1.93	THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS.....	262
10-1.94	PAINT TRAFFIC STRIPES.....	263
10-1.95	PAINT CURB AND STENCIL LETTERING.....	263
10-1.96	PAVEMENT MARKERS	263
SECTION 10-2.	HIGHWAY PLANTING AND IRRIGATION SYSTEMS	265
10-2.01	GENERAL.....	265
10-2.01A	COST BREAK-DOWN.....	266
10-2.02	EXISTING HIGHWAY PLANTING	270
10-2.02A	MAINTAIN EXISTING PLANTED AREAS	270
10-2.02B	REMOVE EXISTING PLANTS FOR TRENCHING	270
10-2.02C	PRUNE EXISTING PLANTS.....	271
10-2.03	EXISTING HIGHWAY IRRIGATION FACILITIES.....	271
10-2.03A	CHECK AND TEST EXISTING IRRIGATION FACILITIES	271
10-2.03B	MAINTAIN EXISTING IRRIGATION FACILITIES	272
10-2.03C	REMOVE EXISTING IRRIGATION FACILITIES.....	272
10-2.04	HIGHWAY PLANTING.....	272
10-2.04A	HIGHWAY PLANTING MATERIALS.....	273
10-2.04B	ROADSIDE CLEARING.....	273
10-2.04C	PESTICIDES	274
10-2.04D	PREPARING PLANTING AREAS	275
10-2.04E	PLANTING.....	275
10-2.04F	WILD FLOWER SEEDING	275
10-2.04G	PLANT ESTABLISHMENT WORK	276
10-2.04H	PAYMENT.....	278
10-2.05	IRRIGATION SYSTEMS	278
10-2.05A	ELECTRIC AUTOMATIC IRRIGATION COMPONENTS.....	278
10-2.05B	REMOTE CONTROL VALVE ACTUATOR SYSTEM.....	280
10-2.05C	BATTERY OPERATED CONTROLLERS.--.....	280
10-2.05D	IRRIGATION SYSTEMS FUNCTIONAL TEST.....	282
10-2.05E	PIPE.....	282
	WATER METER.....	282
10-2.05F	SPRINKLERS	282
10-2.05G	FILTER ASSEMBLY UNIT.....	282

10-2.05H FINAL IRRIGATION SYSTEM CHECK.....	283
SECTION 10-3. SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS.....	283
10-3.01 DESCRIPTION	283
10-3.02 ABBREVIATIONS AND GLOSSARY	284
10-3.03 COST BREAK-DOWN	289
10-3.04 EQUIPMENT LIST AND DRAWINGS.....	290
10-3.05 MAINTAINING EXISTING AND TEMPORARY ELECTRICAL SYSTEMS.....	291
MAINTAINING EXISTING CLOSED CIRCUIT TELEVISION AND FIBER OPTIC COMMUNICATION SYSTEM FACILITIES	291
LIGHTING AND SIGN ILLUMINATION, RAMP METERING, TRAFFIC MONITORING (COUNT) STATION AND CENSUS STATION SYSTEMS RESTRICTIONS	291
10-3.06 FOUNDATIONS	292
10-3.07 STANDARDS, STEEL PEDESTALS AND POSTS.....	292
10-3.08 MAST ARM REPLACEMENT OR MODIFICATION	293
10-3.09 SLIP BASE INSERTS.....	293
10-3.10 CONDUIT	293
COMMUNICATION CONDUIT.....	294
TWO 4 INCH CONDUIT (ATTACHED TO BRIDGE)	295
FIBERGLASS CONDUIT.....	296
HANGERS AND CONCRETE SUPPORTS (BRIDGE).....	296
10-3.11 1-1/4-INCH INNERDUCT.....	297
10-3.12 PULL BOXES	297
TRAFFIC PULL BOXES.....	297
COMMUNICATION PULL BOXES.....	298
10-3.13 SPLICE VAULT.....	299
10-3.14 CONDUCTORS AND WIRING.....	299
TWISTED PAIR CABLE.....	302
10-3.15 TERMINAL BLOCK	304
10-3.16 TWISTED PAIR SPLICE CLOSURE	305
10-3.17 STATE-FURNISHED CHANGEABLE MESSAGE SIGN WIRING HARNESS NO. 4 AND 5.....	305
10-3.18 SERVICE.....	306
ELECTRIC SERVICE (IRRIGATION).....	306
10-3.19 NUMBERING ELECTRICAL EQUIPMENT.....	306
10-3.20 MODEL 170 TYPE 334-TV CONTROLLER ASSEMBLIES.....	307
10-3.21 STATE-FURNISHED MODEL 170 TYPE 334 CONTROLLER ASSEMBLIES	307
10-3.22 RELOCATE TRAFFIC MONITORING STATION AND RAMP METERING SYSTEM CONTROLLER ASSEMBLIES	307
10-3.23 IRRIGATION CONTROLLER ENCLOSURE CABINET	307
10-3.24 VEHICLE SIGNAL FACES AND SIGNAL HEADS.....	308
10-3.25 DETECTORS	312
10-3.26 MICROWAVE VEHICLE DETECTION SENSOR	313
10-3.27 LUMINAIRES.....	315
10-3.28 SOFFIT AND WALL LUMINAIRES	315
10-3.29 INTERNALLY ILLUMINATED "METER ON" SIGNS	315
10-3.30 PHOTOELECTRIC CONTROLS.....	315
10-3.31 RELOCATE CHANGEABLE MESSAGE SIGN SYSTEM.....	315
10-3.32 FIBER OPTIC CABLE PLANT.....	316
DESCRIPTION.....	316
DEFINITIONS.....	316
FIBER OPTIC OUTSIDE PLANT CABLE.....	317
LABELING.....	321
CABLE INSTALLATION	324
SPLICING.....	325
SPLICE CLOSURES.....	325
SPLICE TRAYS.....	326
PASSIVE CABLE ASSEMBLIES AND COMPONENTS	326
FIBER OPTIC CABLE TERMINATIONS.....	326
FIBER DISTRIBUTION UNIT.....	328
FIBER OPTIC TESTING.....	328

10-3.33	RELOCATE AND MODIFY CLOSED CIRCUIT TELEVISION CAMERA EQUIPMENT	333
	CLOSED CIRCUIT TELEVISION CAMERA POLE.....	333
	RELOCATE EXISTING PAN AND TILT UNIT	333
	RELOCATE EXISTING CAMERA CONTROL RECEIVER.....	333
	RELOCATE EXISTING MODEM.....	334
	RELOCATE EXISTING CAMERA JUNCTION BOXES	335
	RELOCATE EXISTING CLOSED CIRCUIT TELEVISION WIRING	335
	RELOCATE EXISTING MODEL 170 BASED CABINETS	335
	RELOCATE EXISTING TYPE 334-TV CABINET	335
	RELOCATE EXISTING SINGLE VIDEO TRANSMITTER.....	336
	RELOCATE EXISTING SINGLE VIDEO RECEIVER	336
	RELOCATE EXISTING CAMERA ASSEMBLY	336
	RELOCATE EXISTING CLOSED CIRCUIT TELEVISION CAMERA	336
	RELOCATE EXISTING CLOSED CIRCUIT TELEVISION CAMERA LENS	337
	RELOCATE EXISTING CAMERA HOUSING	337
10-3.34	COMMUNICATION EQUIPMENT	337
	WORK AT THE EXISTING SAN GABRIEL VALLEY COMMUNICATION HUB	337
	EXISTING D4 CHANNEL BANK.....	337
10-3.35	COMMUNICATION SYSTEM CUTOVER.....	338
10-3.36	SYSTEM TESTING AND DOCUMENTATION	338
	SYSTEM DOCUMENTATION.....	342
	FINAL ACCEPTANCE.....	343
10-3.37	REMOVING, REINSTALLING, DISPOSING OR SALVAGING ELECTRICAL EQUIPMENT.....	344
10-3.38	PAYMENT	344
SECTION 11.	MODIFIED STANDARD SPECIFICATION SECTIONS	346
SECTION 11-1.	QUALITY CONTROL / QUALITY ASSURANCE	346
SECTION 39:	ASPHALT CONCRETE.....	346
39-1	GENERAL.....	346
	39-1.01 DESCRIPTION	346
39-2	MATERIALS.....	347
	39-2.01 ASPHALTS	347
	39-2.02 AGGREGATE.....	347
	39-2.03 ASPHALT CONCRETE MIXTURE	348
	39-2.04 PAVEMENT REINFORCING FABRIC	349
39-3	ASPHALT CONCRETE MIX DESIGN PROPOSAL AND REVIEW	349
	39-3.01 CONTRACTOR MIX DESIGN PROPOSAL	349
	39-3.02 ENGINEER REVIEW OF ASPHALT CONCRETE MIX DESIGN	349
39-4	CONTRACTOR QUALITY CONTROL.....	350
	39-4.01 GENERAL.....	350
	39-4.02 QUALITY CONTROL PLAN	350
	39-4.03 CONTRACTOR QUALITY CONTROL INSPECTION, SAMPLING, AND TESTING.....	351
	39-4.04 CONTRACTOR PROCESS CONTROL	351
	39-4.05 CONTRACTOR QUALITY CONTROL.....	352
	39-4.06 CHARTS AND RECORDS.....	353
	39-4.06A Compliance Charts.....	353
	39-4.06B Records of Inspection and Testing.....	353
39-5	ENGINEER QUALITY ASSURANCE	354
	39-5.01 GENERAL.....	354
	39-5.02 SAMPLING AND TESTING FOR VERIFICATION	354
	39-5.03 VERIFICATION	355
39-6	DISPUTE RESOLUTION	356
	39-6.01 GENERAL.....	356
	39-6.02 DURING THE ASPHALT CONCRETE MIX DESIGN REVIEW	357
	39-6.03 DURING THE PRODUCTION START-UP EVALUATION	357
	39-6.04 DURING PRODUCTION	357
39-7	STORING, PROPORTIONING AND MIXING MATERIALS.....	358
	39-7.01 STORAGE.....	358
	39-7.01A Aggregate Cold Storage.....	358
	39-7.01B Aggregate Hot Storage.....	358

39-7.01C Asphalt Binder Storage	358
39-7.02 DRYING	359
39-7.03 PROPORTIONING	359
39-7.03A Proportioning for Batch Mixing	359
39-7.03B Proportioning for Continuous Mixing	360
39-7.04 (BLANK)	361
39-7.05 MIXING	361
39-7.05A Batch Mixing	361
39-7.05B Continuous Mixing	362
39-7.06 ASPHALT CONCRETE STORAGE	362
39-7.07 ASPHALT CONCRETE PLANTS	362
39-8 SUBGRADE, PRIME COAT, PAINT BINDER (TACK COAT), AND PAVEMENT REINFORCING FABRIC	362
39-8.01 SUBGRADE	362
39-8.02 PRIME COAT AND PAINT BINDER (TACK COAT)	363
39-8.03 PAVEMENT REINFORCING FABRIC	363
39-9 SPREADING AND COMPACTING EQUIPMENT	364
39-9.01 SPREADING EQUIPMENT	364
39-9.02 COMPACTING EQUIPMENT	364
39-10 SPREADING AND COMPACTING	364
39-10.01 GENERAL REQUIREMENTS	364
39-10.02 PRODUCTION START-UP EVALUATION AND NUCLEAR DENSITY TEST STRIPS	365
39-10.02A Production Start-Up Evaluation	366
39-10.02B Nuclear Density Test Strip	366
39-10.03 SPREADING	367
39-10.04 COMPACTING	367
39-11 ACCEPTANCE OF WORK	368
39-11.01 GENERAL	368
39-11.02 STATISTICAL EVALUATION AND DETERMINATION OF PAY FACTOR	368
39-11.02A General	368
39-11.02B Statistical Evaluation	369
39-11.02C Pay Factor Determination and Compensation Adjustment	370
39-12 MEASUREMENT AND PAYMENT	376
39-12.01 MEASUREMENT	376
39-12.02 PAYMENT	376
SECTION 11-2. PORTLAND CEMENT CONCRETE	377
SECTION 12. (BLANK)	400
SECTION 13: RAILROAD RELATIONS AND INSURANCE REQUIREMENTS	400
SECTION 13-1: RELATIONS WITH RAILROAD COMPANY (UNION PACIFIC RAILROAD COMPANY)	400
13-1.01 GENERAL	400
13-1.02 RAILROAD REQUIREMENTS	400
13-1.03 PROTECTION OF RAILROAD FACILITIES	402
13-1.04 WORK BY RAILROAD	402
13-1.05 DELAYS DUE TO WORK BY RAILROAD	402
13-1.06 LEGAL RELATIONS	403
SECTION 13-2. RAILROAD PROTECTIVE INSURANCE	404
SECTION 13-3. RELATIONS WITH SCRR	416
13-3.01 GENERAL	416
13-3.01A PURPOSE	416
13-3.01B DEFINITIONS	416
13-3.01C SUBMITTAL	417
13-3.02 RULES AND REQUIREMENTS	417
13-3.02A REFERENCES	417
13-3.02B COORDINATION	417
13-3.02C EXCAVATION AND BACKFILL	418
13-3.02D CLEARANCES	418
13-3.02E SCRR SAFETY AND PROTECTIVE SERVICES	418
13-3.02F TIME OF WORK	419
13-3.02G UTILITIES	419
13-3.02H HAZARDOUS/TOXIC MATERIALS	419

13-3.02I EXPLOSIVES.....	420
13-3.02J TEMPORARY CONSTRUCTION CROSSINGS	420
13-3.02K TRAFFIC CONTROL.....	420
13-3.02L SHEETING AND SHORING REQUIREMENTS	420
13-3.02M RESTORATION OF PROPERTY	421
SECTION 14 FEDERAL REQUIREMENTS FOR FEDERAL-AID CONSTRUCTION PROJECTS	437
FEDERAL REQUIREMENT TRAINING SPECIAL PROVISIONS	456

DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS

CONTRACT NO. 07-1069U4

07-LA-10-28.0/31.2

Sealed proposals for the work shown on the plans entitled:

STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROJECT PLANS FOR CONSTRUCTION ON STATE HIGHWAY IN LOS ANGELES COUNTY IN EL MONTE AND BALDWIN PARK FROM BALDWIN AVENUE UNDERCROSSING TO ROUTE 605/10 SEPARATION

will be received at the Department of Transportation, 3347 Michelson Drive, Suite 100, Irvine, CA 92612-1692, until 2 o'clock p.m. on November 1, 2001, at which time they will be publicly opened and read in Room C - 1116 at the same address.

Proposal forms for this work are included in a separate book entitled:

STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROPOSAL AND CONTRACT FOR CONSTRUCTION ON STATE HIGHWAY IN LOS ANGELES COUNTY IN EL MONTE AND BALDWIN PARK FROM BALDWIN AVENUE UNDERCROSSING TO ROUTE 605/10 SEPARATION

General work description: Freeway to be widened by paving with portland cement concrete over lean concrete base and 14 bridges to be widened.

This project has a goal of 18 percent disadvantaged business enterprise (DBE) participation. No prebid meeting is scheduled for this project.

THIS PROJECT IS SUBJECT TO THE "BUY AMERICA" PROVISIONS OF THE SURFACE TRANSPORTATION ASSISTANCE ACT OF 1982 AS AMENDED BY THE INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT OF 1991.

Bids are required for the entire work described herein.

At the time this contract is awarded, the Contractor shall possess either a Class A license or a combination of Class C licenses which constitutes a majority of the work.

This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code, Section 12990.

Project plans, special provisions, and proposal forms for bidding this project can only be obtained at the Department of Transportation, Plans and Bid Documents, Room 0200, MS #26, Transportation Building, 1120 N Street, Sacramento, California 95814, FAX No. (916) 654-7028, Telephone No. (916) 654-4490. Use FAX orders to expedite orders for project plans, special provisions and proposal forms. FAX orders must include credit card charge number, card expiration date and authorizing signature. Project plans, special provisions, and proposal forms may be seen at the above Department of Transportation office and at the offices of the District Directors of Transportation at Irvine, Oakland, and the district in which the work is situated. Standard Specifications are available through the State of California, Department of Transportation, Publications Unit, 1900 Royal Oaks Drive, Sacramento, CA 95815, Telephone No. (916) 445-3520.

Cross sections for this project are available at the office of the District Director of Transportation of the district in which the work is situated in paper copy format.

The successful bidder shall furnish a payment bond and a performance bond.

The Department of Transportation hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation.

The U.S. Department of Transportation (DOT) provides a toll-free "hotline" service to report bid rigging activities. Bid rigging activities can be reported Mondays through Fridays, between 8:00 a.m. and 5:00 p.m., eastern time, Telephone No. 1-800-424-9071. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report these activities. The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated, and available from the California Department of Industrial Relations' Internet Web Site at: <http://www.dir.ca.gov>. The Federal minimum wage rates for this project as predetermined by the United States Secretary of Labor are set forth in the books issued for bidding purposes entitled "Proposal and Contract," and in copies of this book that may be examined at the offices described above where project plans, special provisions, and proposal forms may be seen. Addenda to modify the Federal minimum wage rates, if necessary, will be issued to holders of "Proposal and Contract" books. Future effective general prevailing wage rates which have been predetermined and are on file with the California Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

Attention is directed to the Federal minimum wage rate requirements in the books entitled "Proposal and Contract." If there is a difference between the minimum wage rates predetermined by the Secretary of Labor and the general prevailing wage rates determined by the Director of the California Department of Industrial Relations for similar classifications of labor, the Contractor and subcontractors shall pay not less than the higher wage rate. The Department will not accept lower State wage rates not specifically included in the Federal minimum wage determinations. This includes "helper" (or other classifications based on hours of experience) or any other classification not appearing in the Federal wage determinations. Where Federal wage determinations do not contain the State wage rate determination otherwise available for use by the Contractor and subcontractors, the Contractor and subcontractors shall pay not less than the Federal minimum wage rate which most closely approximates the duties of the employees in question.

DEPARTMENT OF TRANSPORTATION

Deputy Director Transportation Engineering

Dated September 4, 2001

EFO

COPY OF ENGINEER'S ESTIMATE
(NOT TO BE USED FOR BIDDING PURPOSES)
07-1069U4

Item	Item Code	Item	Unit of Measure	Estimated Quantity
1	070012	PROGRESS SCHEDULE (CRITICAL PATH METHOD)	LS	LUMP SUM
2	070018	TIME-RELATED OVERHEAD	WDAY	650
3 (S)	071321	TEMPORARY FENCE (TYPE CL-6)	LF	460
4	072006	TEMPORARY SUPPORT	LS	LUMP SUM
5	074019	PREPARE STORM WATER POLLUTION PREVENTION PLAN	LS	LUMP SUM
6	074020	WATER POLLUTION CONTROL	LS	LUMP SUM
7 (S)	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM
8 (S)	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM
9 (S)	120120	TYPE III BARRICADE	EA	62
10 (S)	120165	CHANNELIZER (SURFACE MOUNTED)	EA	950
11	120200	FLASHING BEACON (PORTABLE)	EA	100
12 (S)	129000	TEMPORARY RAILING (TYPE K)	LF	65,900
13 (S)	129100	TEMPORARY CRASH CUSHION MODULE	EA	430
14 (S)	022328	TEMPORARY CRASH CUSHION (TYPE REACT 9SCBS)	EA	27
15	150206	ABANDON CULVERT	EA	18
16	150209	ABANDON DRAINAGE FACILITY	EA	3
17	150221	ABANDON INLET	EA	1
18	150608	REMOVE CHAIN LINK FENCE	LF	1,970
19	150662	REMOVE METAL BEAM GUARD RAILING	LF	6,220
20	150668	REMOVE FLARED END SECTION	EA	2

Item	Item Code	Item	Unit of Measure	Estimated Quantity
21	150710	REMOVE TRAFFIC STRIPE	LF	106,000
22	022329	REMOVE YELLOW PAINTED TRAFFIC STRIPE	LF	31,700
23	150722	REMOVE PAVEMENT MARKER	EA	15,800
24	150742	REMOVE ROADSIDE SIGN	EA	17
25	150760	REMOVE SIGN STRUCTURE	EA	21
26	150763	REMOVE SIGN PANEL	EA	1
27	150767	REMOVE BRIDGE MOUNTED SIGN	EA	4
28	150801	REMOVE OVERSIDE DRAIN	EA	2
29	048717	REMOVE AND REPLACE CONCRETE (CHANNEL)	LS	LUMP SUM
30	150805	REMOVE CULVERT	LF	2,030
31	150820	REMOVE INLET	EA	72
32	150821	REMOVE HEADWALL	CY	19
33	150829	REMOVE RETAINING WALL	SQYD	3,440
34	150846	REMOVE CONCRETE PAVEMENT	SQYD	7,260
35	150857	REMOVE ASPHALT CONCRETE SURFACING	SQYD	168
36	151540	RECONSTRUCT CHAIN LINK FENCE	LF	760
37	151572	RECONSTRUCT METAL BEAM GUARD RAILING	LF	40
38	152316	RESET ROADSIDE SIGN (ONE POST)	EA	6
39	022330	RESET PROPERTY FENCE	LF	190
40	152390	RELOCATE ROADSIDE SIGN	EA	91

Item	Item Code	Item	Unit of Measure	Estimated Quantity
41	022331	RELOCATE SIGN PANEL (BRIDGE-MOUNTED)	EA	3
42	152430	ADJUST INLET	EA	6
43 (S)	153112	COLD PLANE ASPHALT CONCRETE PAVEMENT (.15' MAXIMUM)	SQYD	6,740
44	153214	REMOVE CONCRETE CURB	LF	25,400
45	153218	REMOVE CONCRETE SIDEWALK	SQYD	810
46	153221	REMOVE CONCRETE BARRIER	LF	5,830
47	022332	REMOVE CONCRETE (DRAINAGE STRUCTURE)	CY	19
48	153229	REMOVE CONCRETE BARRIER (TYPE K)	LF	500
49	153250	REMOVE SOUND WALL	SQYD	2,220
50	153531	ACCESS OPENING, SOFFIT	EA	36
51	155003	CAP INLET	EA	43
52	157561	BRIDGE REMOVAL (PORTION), LOCATION A	LS	LUMP SUM
53	157562	BRIDGE REMOVAL (PORTION), LOCATION B	LS	LUMP SUM
54	157563	BRIDGE REMOVAL (PORTION), LOCATION C	LS	LUMP SUM
55	157564	BRIDGE REMOVAL (PORTION), LOCATION D	LS	LUMP SUM
56	157565	BRIDGE REMOVAL (PORTION), LOCATION E	LS	LUMP SUM
57	157566	BRIDGE REMOVAL (PORTION), LOCATION F	LS	LUMP SUM
58	157567	BRIDGE REMOVAL (PORTION), LOCATION G	LS	LUMP SUM
59	157568	BRIDGE REMOVAL (PORTION), LOCATION H	LS	LUMP SUM
60	157569	BRIDGE REMOVAL (PORTION), LOCATION I	LS	LUMP SUM

Item	Item Code	Item	Unit of Measure	Estimated Quantity
61	157570	BRIDGE REMOVAL (PORTION), LOCATION J	LS	LUMP SUM
62	157571	BRIDGE REMOVAL (PORTION), LOCATION K	LS	LUMP SUM
63	157572	BRIDGE REMOVAL (PORTION), LOCATION L	LS	LUMP SUM
64	157573	BRIDGE REMOVAL (PORTION), LOCATION M	LS	LUMP SUM
65	048718	BRIDGE REMOVAL (PORTION), LOCATION N	LS	LUMP SUM
66	022333	RECONSTRUCT PEDESTRIAN BARRIER	EA	1
67	160101	CLEARING AND GRUBBING	LS	LUMP SUM
68	190101	ROADWAY EXCAVATION	CY	30,300
69	190103	ROADWAY EXCAVATION (TYPE Y) (AERIALY DEPOSITED LEAD)	CY	30,600
70	190105	ROADWAY EXCAVATION (TYPE Z-2) (AERIALY DEPOSITED LEAD)	CY	4,710
71	190110	LEAD COMPLIANCE PLAN	LS	LUMP SUM
72 (F)	192003	STRUCTURE EXCAVATION (BRIDGE)	CY	7,708
73 (F)	192020	STRUCTURE EXCAVATION (TYPE D)	CY	4,740
74 (F)	192037	STRUCTURE EXCAVATION (RETAINING WALL)	CY	59,837
75	192051	STRUCTURE EXCAVATION (TYPE-Y) (AERIALY DEPOSITED LEAD)	CY	3,280
76	192053	STRUCTURE EXCAVATION (TYPE Z-2) (AERIALY DEPOSITED LEAD)	CY	160
77 (F)	193003	STRUCTURE BACKFILL (BRIDGE)	CY	14,061
78 (F)	193013	STRUCTURE BACKFILL (RETAINING WALL)	CY	59,972
79	193114	SAND BACKFILL	CY	6
80	022334	PREPARE SUBGRADE AND SUBBALLAST (RAILROAD SHOOFLY)	SQYD	2,550

Item	Item Code	Item	Unit of Measure	Estimated Quantity
81 (S)	200001	HIGHWAY PLANTING	LS	LUMP SUM
82 (S)	204053	WILD FLOWER SEEDING	SQYD	510
83 (S)	204098	MAINTAIN EXISTING PLANTS	LS	LUMP SUM
84 (S)	204099	PLANT ESTABLISHMENT WORK	LS	LUMP SUM
85 (S)	208000	IRRIGATION SYSTEM	LS	LUMP SUM
86 (S-F)	208044	3" GALVANIZED STEEL PIPE (SUPPLY LINE ON BRIDGE)	LF	410
87 (S)	208808	8" WELDED STEEL PIPE CONDUIT (.250" THICK)	LF	1,250
88	260210	AGGREGATE BASE (APPROACH SLAB)	CY	74
89	260301	CLASS 3 AGGREGATE BASE	CY	36,400
90	280000	LEAN CONCRETE BASE	CY	23,000
91	390180	ASPHALT CONCRETE (BRIDGE)	TON	376
92	390152	ASPHALT CONCRETE	TON	18,100
93	394002	PLACE ASPHALT CONCRETE (MISCELLANEOUS AREA)	SQYD	450
94	394040	PLACE ASPHALT CONCRETE DIKE (TYPE A)	LF	1,810
95	394044	PLACE ASPHALT CONCRETE DIKE (TYPE C)	LF	640
96	394046	PLACE ASPHALT CONCRETE DIKE (TYPE D)	LF	5,240
97	394049	PLACE ASPHALT CONCRETE DIKE (TYPE F)	LF	220
98	401000	CONCRETE PAVEMENT	CY	24,600
99	404092	SEAL PAVEMENT JOINT	LF	60,600
100	490503	FURNISH STEEL PILING (HP 10 X 42)	LF	2,471

Item	Item Code	Item	Unit of Measure	Estimated Quantity
101 (S)	490504	DRIVE STEEL PILE (HP 10 X 42)	EA	84
102	490508	FURNISH STEEL PILING (HP 10 X 57)	LF	3,791
103 (S)	490509	DRIVE STEEL PILE (HP 10 X 57)	EA	88
104	490528	FURNISH STEEL PILING (HP 14 X 89)	LF	10,894
105 (S)	490529	DRIVE STEEL PILE (HP 14 X 89)	EA	313
106	490538	FURNISH STEEL PILING (HP 14 X 117)	LF	30,474
107 (S)	490539	DRIVE STEEL PILE (HP 14 X 117)	EA	676
108 (S)	490601	16" CAST-IN-DRILLED-HOLE CONCRETE PILING	LF	5,000
109	490713	FURNISH PILING (CLASS 70)	LF	994
110 (S)	490714	DRIVE PILE (CLASS 70)	EA	30
111	490733	FURNISH PILING (CLASS 45C)	LF	3,180
112 (S)	490734	DRIVE PILE (CLASS 45C)	EA	119
113	491004	FURNISH PILING (CLASS 45)	LF	26,836
114 (S)	491005	DRIVE PILE (CLASS 45)	EA	989
115 (S)	498016	16" CAST-IN-DRILLED-HOLE CONCRETE PILING (SOUND WALL)	LF	4,630
116 (S)	500001	PRESTRESSING CAST-IN-PLACE CONCRETE	LS	LUMP SUM
117 (S)	048719	JACKING SUPERSTRUCTURE	LS	LUMP SUM
118 (F)	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	3,442
119 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	CY	10,786
120 (F)	510060	STRUCTURAL CONCRETE, RETAINING WALL	CY	19,815

Item	Item Code	Item	Unit of Measure	Estimated Quantity
121 (F)	510086	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE N)	CY	1,527
122	510087	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE R)	CY	751
123	048720	STRUCTURAL CONCRETE, TRANSITION SLAB	CY	187
124 (F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	259
125	510526	MINOR CONCRETE (BACKFILL)	CY	32
126	510800	PAVING NOTCH EXTENSION	CY	16
127	510805	DIAPHRAGM BOLSTER	EA	18
128	048721	DRILL AND PRESSURE GROUT DOWEL	LF	68
129	511106	DRILL AND BOND DOWEL	LF	4,933
130	511109	DRILL AND BOND DOWEL (EPOXY CARTRIDGE)	EA	712
131 (S)	512205	FURNISH PRECAST PRESTRESSED CONCRETE GIRDER (60'-70')	EA	21
132 (S)	512206	FURNISH PRECAST PRESTRESSED CONCRETE GIRDER (70'-80')	EA	18
133 (S)	512207	FURNISH PRECAST PRESTRESSED CONCRETE GIRDER (80'-90')	EA	6
134 (S)	512500	ERECT PRECAST PRESTRESSED CONCRETE GIRDER	EA	45
135 (F)	513501	CONCRETE CLOSURE WALL	SQFT	1,070
136	515020	REFINISH BRIDGE DECK	SQFT	5,418
137 (S)	515061	CORE CONCRETE (2")	LF	4,514
138 (S)	515065	CORE CONCRETE (6")	LF	106
139 (S)	515068	CORE CONCRETE (9")	LF	90
140 (S)	048722	CORE CONCRETE (18")	LF	7

Item	Item Code	Item	Unit of Measure	Estimated Quantity
141 (S)	515160	CORE CONCRETE (1 1/2")	LF	153
142 (S-F)	517961	SOUND WALL (BARRIER) (MASONRY BLOCK)	SQFT	102,130
143	519050	EXPANSION DAM	CF	53
144 (S)	519085	JOINT SEAL (TYPE B-MR 1")	LF	406
145 (S)	519086	JOINT SEAL (TYPE B-MR 1 1/2")	LF	600
146 (S)	519101	JOINT SEAL (TYPE A)	LF	1,797
147 (S-F)	520102	BAR REINFORCING STEEL (BRIDGE)	LB	3,280,010
148 (S-F)	520103	BAR REINFORCING STEEL (RETAINING WALL)	LB	2,162,829
149 (S-F)	540101	ASPHALT MEMBRANE WATERPROOFING	SQFT	2,398
150 (S-F)	550110	COLUMN CASING	LB	47,700
151 (F)	550203	FURNISH STRUCTURAL STEEL (BRIDGE)	LB	390,000
152 (S)	550204	ERECT STRUCTURAL STEEL (BRIDGE)	LB	390,000
153 (S-F)	560218	FURNISH SIGN STRUCTURE (TRUSS)	LB	215,260
154 (S-F)	560219	INSTALL SIGN STRUCTURE (TRUSS)	LB	215,260
155 (F)	560223	FURNISH SIGN STRUCTURE (BRIDGE MOUNTED WITHOUT WALKWAY)	LB	900
156 (S-F)	560224	INSTALL SIGN STRUCTURE (BRIDGE MOUNTED WITHOUT WALKWAY)	LB	900
157 (S-F)	561004	30" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	74
158 (S-F)	561005	36" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	92
159 (S-F)	561011	48" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	18
160	562002	METAL (BARRIER MOUNTED SIGN)	LB	2,990

Item	Item Code	Item	Unit of Measure	Estimated Quantity
161	022335	METAL (WALL MOUNTED FLUSH SIGN)	LB	280
162	022336	METAL (CONCRETE BARRIER MOUNTED FLUSH SIGN)	LB	370
163	022337	METAL (WALL MOUNTED SIGN)	LB	970
164	566011	ROADSIDE SIGN - ONE POST	EA	18
165	566012	ROADSIDE SIGN - TWO POST	EA	1
166	568001	INSTALL SIGN (STRAP AND SADDLE BRACKET METHOD)	EA	28
167	568007	INSTALL SIGN OVERLAY	SQFT	190
168 (S)	590115	CLEAN AND PAINT STRUCTURAL STEEL	LS	LUMP SUM
169 (S)	048723	WORK AREA MONITORING LOCATION G	LS	LUMP SUM
170 (S)	048724	WORK AREA MONITORING LOCATION H	LS	LUMP SUM
171 (S)	048725	WORK AREA MONITORING LOCATION I	LS	LUMP SUM
172	650010	12" REINFORCED CONCRETE PIPE	LF	14
173	650012	15" REINFORCED CONCRETE PIPE	LF	150
174	650014	18" REINFORCED CONCRETE PIPE	LF	1,780
175	650018	24" REINFORCED CONCRETE PIPE	LF	1,480
176	650026	36" REINFORCED CONCRETE PIPE	LF	76
177	665016	18" CORRUGATED STEEL PIPE (.064" THICK)	LF	450
178	665022	24" CORRUGATED STEEL PIPE (.064" THICK)	LF	40
179	665717	18" SLOTTED CORRUGATED STEEL PIPE (.079" THICK)	LF	210
180	022338	15" SLOTTED CORRUGATED STEEL PIPE (0.079" THICK)	LF	80

Item	Item Code	Item	Unit of Measure	Estimated Quantity
181	681103	3" PLASTIC PIPE (EDGE DRAIN)	LF	17,700
182	681107	3" PLASTIC PIPE (EDGE DRAIN OUTLET)	LF	660
183	048726	DRAINAGE SYSTEM (BRIDGE)	LS	LUMP SUM
184	690110	12" CORRUGATED STEEL PIPE DOWNDRAIN	LF	26
185	692005	12" ENTRANCE TAPER	EA	1
186	692305	12" ANCHOR ASSEMBLY	EA	1
187	703210	12" CORRUGATED STEEL PIPE RISER (.064" THICK)	LF	42
188	703216	18" CORRUGATED STEEL PIPE RISER (.064" THICK)	LF	32
189	705007	12" STEEL FLARED END SECTION	EA	1
190	705011	18" STEEL FLARED END SECTION	EA	4
191	705527	36" AUTOMATIC DRAINAGE GATE	EA	1
192	707217	36" PRECAST CONCRETE PIPE MANHOLE	LF	30
193	721006	ROCK SLOPE PROTECTION (1/2 TON, METHOD B)	CY	180
194	721007	ROCK SLOPE PROTECTION (1/4 TON, METHOD B)	CY	53
195	721008	ROCK SLOPE PROTECTION (LIGHT, METHOD B)	CY	11
196	721009	ROCK SLOPE PROTECTION (FACING, METHOD B)	CY	9
197	721012	ROCK SLOPE PROTECTION (BACKING NO. 3, METHOD B)	CY	13
198	729010	ROCK SLOPE PROTECTION FABRIC	SQYD	70
199	731502	MINOR CONCRETE (MISCELLANEOUS CONSTRUCTION)	CY	270
200 (S-F)	750001	MISCELLANEOUS IRON AND STEEL	LB	51,223

Item	Item Code	Item	Unit of Measure	Estimated Quantity
201 (S-F)	750496	MISCELLANEOUS METAL (RESTRAINER - PIPE TYPE)	LB	11,000
202 (S-F)	750498	MISCELLANEOUS METAL (RESTRAINER - CABLE TYPE)	LB	24,790
203 (S)	048727	MODIFY CABLE RESTRAINER (TYPE A)	LS	LUMP SUM
204 (S)	048728	MODIFY CABLE RESTRAINER (TYPE B)	LS	LUMP SUM
205 (S)	048729	MODIFY CABLE RESTRAINER (TYPE C)	LS	LUMP SUM
206 (S-F)	048730	CONFINEMENT ASSEMBLY	EA	51
207 (S-F)	750501	MISCELLANEOUS METAL (BRIDGE)	LB	1,617
208 (S)	800360	CHAIN LINK FENCE (TYPE CL-6)	LF	480
209 (S)	802501	4' CHAIN LINK GATE (TYPE CL-6)	EA	19
210	820107	DELINEATOR (CLASS 1)	EA	180
211	820130	OBJECT MARKER	EA	25
212	820180	INSTALL MEDIAN MILEAGE PANEL	EA	34
213 (S)	832003	METAL BEAM GUARD RAILING (WOOD POST)	LF	1,100
214 (S-F)	833032	CHAIN LINK RAILING (TYPE 7)	LF	239
215	833080	CONCRETE BARRIER (TYPE K)	LF	360
216 (F)	833160	CONCRETE BARRIER (TYPE 27)	LF	18,261
217	833165	CONCRETE BARRIER (TYPE 27B MODIFIED)	LF	170
218	833184	CONCRETE BARRIER (TYPE 27SV MODIFIED)	LF	1,540
219	839481	CONCRETE BARRIER (TYPE 50)	LF	180
220	839487	CONCRETE BARRIER (TYPE 50C)	LF	340

Item	Item Code	Item	Unit of Measure	Estimated Quantity
221	839488	CONCRETE BARRIER (TYPE 50C MODIFIED)	LF	92
222	839489	CONCRETE BARRIER (TYPE 50D)	LF	1,680
223	839491	CONCRETE BARRIER (TYPE 50E)	LF	380
224	839492	CONCRETE BARRIER (TYPE 50E MODIFIED)	LF	56
225	839521	CABLE RAILING	LF	100
226 (S)	839552	TERMINAL SECTION (TYPE C)	EA	8
227 (S)	839565	TERMINAL SYSTEM (TYPE SRT)	EA	14
228 (S)	839568	TERMINAL ANCHOR ASSEMBLY (TYPE SFT)	EA	5
229 (S)	022339	CRASH CUSHION (TYPE REACT 9SCBS)	EA	8
230	839701	CONCRETE BARRIER (TYPE 60)	LF	530
231	839702	CONCRETE BARRIER (TYPE 60A)	LF	440
232	839703	CONCRETE BARRIER (TYPE 60C)	LF	220
233	022340	CONCRETE BARRIER (TYPE 60W)	LF	2,800
234 (F)	839720	CONCRETE BARRIER (TYPE 732)	LF	245
235 (F)	839725	CONCRETE BARRIER (TYPE 736)	LF	231
236 (S)	840504	4" THERMOPLASTIC TRAFFIC STRIPE	LF	127,000
237 (S)	840506	8" THERMOPLASTIC TRAFFIC STRIPE	LF	11,700
238 (S)	840508	8" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 12-3)	LF	11,600
239 (S)	840515	THERMOPLASTIC PAVEMENT MARKING	SQFT	10,100
240 (S)	840526	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 17-7)	LF	9,000

Item	Item Code	Item	Unit of Measure	Estimated Quantity
241 (S)	840550	8" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 36-12)	LF	5,620
242 (S)	840653	PAINT TRAFFIC STRIPE	LF	145,000
243 (S)	840656	PAINT TRAFFIC STRIPE (2-COAT)	LF	59,700
244 (S)	022341	PAVEMENT MARKER (NON-REFLECTIVE)	EA	22,600
245 (S)	850111	PAVEMENT MARKER (RETROREFLECTIVE)	EA	13,400
246 (S)	860460	LIGHTING AND SIGN ILLUMINATION	LS	LUMP SUM
247 (S)	022342	RELOCATE CHANGEABLE MESSAGE SIGN SYSTEM	LS	LUMP SUM
248 (S)	860640	IRRIGATION CONTROLLER ENCLOSURE CABINET	EA	10
249 (S)	022343	4" CONDUIT (TRENCHED IN SOIL)	LF	180
250 (S)	022344	TWO 4" CONDUIT (TRENCHED IN SOIL)	LF	180
251 (S)	022345	3" CONDUIT (TRENCHED IN SOIL)	LF	150
252 (S)	022346	3" CONDUIT (TRENCHED IN PAVEMENT)	LF	40
253 (S)	022347	TWO 4" CONDUIT (TRENCHED IN PAVEMENT)	LF	10,700
254 (S)	022348	TWO 4" RIGID STEEL CONDUIT (JACKED)	LF	1,050
255 (S)	022349	3" RIGID STEEL CONDUIT (JACKED)	LF	580
256 (S)	022350	2" RIGID STEEL CONDUIT (JACKED)	LF	70
257 (S)	022351	2" CONDUIT (TRENCHED IN SOIL)	LF	900
258 (S)	022352	2" CONDUIT (TRENCHED IN PAVEMENT)	LF	620
259 (S)	860790	1 1/4" INNERDUCT	LF	28,900
260 (S)	860791	COMMUNICATION CONDUIT	LS	LUMP SUM

Item	Item Code	Item	Unit of Measure	Estimated Quantity
261 (S)	022353	TWO 4" CONDUIT (ATTACHED TO BRIDGE)	LF	4,750
262 (S-F)	860796	SPRINKLER CONTROL CONDUIT (BRIDGE)	LF	240
263 (S)	860797	ELECTRIC SERVICE (IRRIGATION)	LS	LUMP SUM
264 (S)	022354	MODIFY CENSUS STATION SYSTEM	LS	LUMP SUM
265 (S)	022355	MODIFY TRAFFIC MONITORING STATION (LOCATION SB291)	LS	LUMP SUM
266 (S)	022356	MODIFY CLOSE CIRCUIT TELEVISION CAMERA (LOCATION SB311)	LS	LUMP SUM
267 (S)	022357	MODIFY CLOSE CIRCUIT TELEVISION CAMERA (LOCATION SB303)	LS	LUMP SUM
268 (S)	022358	MODIFY CLOSE CIRCUIT TELEVISION CAMERA (LOCATION SB285)	LS	LUMP SUM
269 (S)	022359	WORK AT THE EXISTING SAN GABRIEL VALLEY COMMUNICATION HUB	LS	LUMP SUM
270 (S)	022360	MODIFY RAMP METERING SYSTEM (LOCATION 0741)	LS	LUMP SUM
271 (S)	022361	MODIFY RAMP METERING SYSTEM (LOCATION 0796)	LS	LUMP SUM
272 (S)	022362	MODIFY RAMP METERING SYSTEM (LOCATION 0430)	LS	LUMP SUM
273 (S)	022363	MODIFY RAMP METERING SYSTEM (LOCATION 0745)	LS	LUMP SUM
274 (S)	022364	MODIFY RAMP METERING SYSTEM (LOCATIONS 0431 & 0794)	LS	LUMP SUM
275 (S)	022365	MODIFY RAMP METERING SYSTEM (LOCATION 0432)	LS	LUMP SUM
276 (S)	022366	MODIFY RAMP METERING SYSTEM (LOCATION 0433)	LS	LUMP SUM
277 (S)	022367	MODIFY RAMP METERING SYSTEM (LOCATION 0741)	LS	LUMP SUM
278 (S)	022368	LIGHTING (UNDERCROSSING) (LOCATION 1)	LS	LUMP SUM
279 (S)	022369	LIGHTING (UNDERCROSSING) (LOCATION 2)	LS	LUMP SUM
280 (S)	022370	LIGHTING (UNDERCROSSING) (LOCATION 3)	LS	LUMP SUM

Item	Item Code	Item	Unit of Measure	Estimated Quantity
281 (S)	022371	LIGHTING (UNDERCROSSING) (LOCATION 4)	LS	LUMP SUM
282 (S)	022372	LIGHTING (UNDERCROSSING) (LOCATION 5)	LS	LUMP SUM
283 (S)	022373	LIGHTING (UNDERCROSSING) (LOCATION 6)	LS	LUMP SUM
284 (S)	022374	LIGHTING (UNDERCROSSING) (LOCATION 7)	LS	LUMP SUM
285 (S)	022375	LIGHTING (UNDERCROSSING) (LOCATION 8)	LS	LUMP SUM
286 (S)	022376	LIGHTING (UNDERCROSSING) (LOCATION 9)	LS	LUMP SUM
287 (S)	022377	LIGHTING (UNDERCROSSING) (LOCATION 10)	LS	LUMP SUM
288 (S)	022378	LIGHTING (UNDERCROSSING) (LOCATION 11)	LS	LUMP SUM
289 (S)	022379	LIGHTING (UNDERCROSSING) (LOCATION 12)	LS	LUMP SUM
290 (S)	022380	LIGHTING (UNION PACIFIC RAILROAD)	LS	LUMP SUM
291 (S)	867010	2 SINGLEMODE FIBER OPTIC BREAKOUT CABLE	LF	85
292 (S)	867014	12 SINGLEMODE FIBER OPTIC CABLE	LF	14,500
293 (S)	867016	36 SINGLEMODE FIBER OPTIC CABLE	LF	14,500
294 (S)	867130	FIBER OPTIC SPLICE CLOSURE	EA	5
295 (S)	867135	TWISTED PAIR SPLICE CLOSURE	EA	18
296 (S)	022381	2 NO. 6 CONDUCTORS	LF	830
297 (S)	022382	2 NO. 8 CONDUCTORS	LF	640
298 (S)	022383	2 NO. 1 CONDUCTORS	LF	770
299 (S)	022384	4 NO. 18 TELEPHONE CABLE	LF	180
300 (S)	869025	TWISTED PAIR CABLE (6 PAIR)	LF	7,920

Item	Item Code	Item	Unit of Measure	Estimated Quantity
301 (S)	869029	TWISTED PAIR CABLE (50 PAIR)	LF	14,500
302 (S)	869034	NO. 5(T) PULL BOX	EA	2
303 (S)	869035	NO. 5 PULL BOX	EA	4
304 (S)	869036	NO. 6 PULL BOX	EA	2
305 (S)	869039	COMMUNICATION PULL BOX	EA	66
306 (S)	869047	SPLICE VAULT	EA	6
307 (S)	022385	INTERIM RAMP METERING SYSTEM	LS	LUMP SUM
308 (S)	022386	SYSTEM TESTING AND DOCUMENTATION	LS	LUMP SUM
309	999990	MOBILIZATION	LS	LUMP SUM

**STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION**

SPECIAL PROVISIONS

Annexed to Contract No. 07-1069U4

SECTION 1. SPECIFICATIONS AND PLANS

The work embraced herein shall conform to the provisions in the Standard Specifications dated July 1992, and these special provisions.

Amendments to the Standard Specifications set forth in these special provisions shall be considered as part of the Standard Specifications for the purposes set forth in Section 5-1.04, "Coordination and Interpretation of Plans, Standard Specifications and Special Provisions," of the Standard Specifications. Whenever either the term "Standard Specifications is amended" or the term "Standard Specifications are amended" is used in the special provisions, the indented text following said term shall be considered an amendment to the Standard Specifications. In case of conflict between such amendments and the Standard Specifications, the amendments shall take precedence over and be used in lieu of the conflicting portions.

In case of conflict between the Standard Specifications and these special provisions, the special provisions shall take precedence over and be used in lieu of the conflicting portions.

SECTION 2. PROPOSAL REQUIREMENTS AND CONDITIONS

2-1.01 GENERAL

The bidder's attention is directed to the provisions in Section 2, "Proposal Requirements and Conditions," of the Standard Specifications and these special provisions for the requirements and conditions which the bidder must observe in the preparation of the Proposal form and the submission of the bid.

In addition to the subcontractors required to be listed in conformance with Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications, each proposal shall have listed therein the portion of work that will be performed by each subcontractor listed.

The Bidder's Bond form mentioned in the last paragraph in Section 2-1.07, "Proposal Guaranty," of the Standard Specifications will be found following the signature page of the Proposal.

Submit request for substitution of an "or equal" item, and the data substantiating the request to the Department of Transportation, Construction Division Chief, 120 S. Spring Street, Room 232, Los Angeles, CA 90012, so that the request is received by the Department by close of business on the fourth day, not including Saturdays, Sundays and legal holidays, following bid opening.

In conformance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Proposal. Signing the Proposal shall also constitute signature of the Noncollusion Affidavit.

The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate. Each subcontract signed by the bidder must include this assurance.

2-1.015 FEDERAL LOBBYING RESTRICTIONS

Section 1352, Title 31, United States Code prohibits Federal funds from being expended by the recipient or any lower tier subrecipient of a Federal-aid contract to pay for any person for influencing or attempting to influence a Federal agency or Congress in connection with the awarding of any Federal-aid contract, the making of any Federal grant or loan, or the entering into of any cooperative agreement.

If any funds other than Federal funds have been paid for the same purposes in connection with this Federal-aid contract, the recipient shall submit an executed certification and, if required, submit a completed disclosure form as part of the bid documents.

A certification for Federal-aid contracts regarding payment of funds to lobby Congress or a Federal agency is included in the Proposal. Standard Form - LLL, "Disclosure of Lobbying Activities," with instructions for completion of the Standard Form is also included in the Proposal. Signing the Proposal shall constitute signature of the Certification.

The above-referenced certification and disclosure of lobbying activities shall be included in each subcontract and any lower-tier contracts exceeding \$100,000. All disclosure forms, but not certifications, shall be forwarded from tier to tier until received by the Engineer.

The Contractor, subcontractors and any lower-tier contractors shall file a disclosure form at the end of each calendar quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any disclosure form previously filed by the Contractor, subcontractors and any lower-tier contractors. An event that materially affects the accuracy of the information reported includes:

- A. A cumulative increase of \$25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or
- B. A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or,
- C. A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

2-1.02 DISADVANTAGED BUSINESS ENTERPRISE (DBE)

This project is subject to Part 26, Title 49, Code of Federal Regulations entitled "Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs." The Regulations in their entirety are incorporated herein by this reference.

Bidders shall be fully informed respecting the requirements of the Regulations and the Department's Disadvantaged Business Enterprise (DBE) program developed pursuant to the Regulations; particular attention is directed to the following matters:

- A. A DBE must be a small business concern as defined pursuant to Section 3 of U.S. Small Business Act and relevant regulations promulgated pursuant thereto.
- B. A DBE may participate as a prime contractor, subcontractor, joint venture partner with a prime or subcontractor, vendor of material or supplies, or as a trucking company.
- C. A DBE bidder, not bidding as a joint venture with a non-DBE, will be required to document one or a combination of the following:
 - 1. The bidder will meet the goal by performing work with its own forces.
 - 2. The bidder will meet the goal through work performed by DBE subcontractors, suppliers or trucking companies.
 - 3. The bidder, prior to bidding, made adequate good faith efforts to meet the goal.
- D. A DBE joint venture partner must be responsible for specific contract items of work, or portions thereof. Responsibility means actually performing, managing and supervising the work with its own forces. The DBE joint venture partner must share in the capital contribution, control, management, risks and profits of the joint venture. The DBE joint venturer must submit the joint venture agreement with the proposal or the DBE Information form required in the Section entitled "Submission of DBE Information" of these special provisions.
- E. A DBE must perform a commercially useful function, i.e., must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing and supervising the work.
- F. DBEs must be certified by either the California Department of Transportation, or by a participating State of California or local agency which certifies in conformance with Title 49, Code of Federal Regulations, Part 26, as of the date of bid opening. It is the Contractor's responsibility to verify that DBEs are certified. Listings of DBEs certified by the Department are available from the following sources:
 - 1. The Department's DBE Directory, which is published quarterly. This Directory may be obtained from the Department of Transportation, Materiel Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520.
 - 2. The Department's Electronic Information Bulletin Board Service, which is accessible by modem and is updated weekly. The Bulletin Board may be accessed by first contacting the Department's Business Enterprise Program at Telephone: (916) 227-8937 and obtaining a user identification and password.
 - 3. The Department's web site at <http://www.dot.ca.gov/hq/bep/index.htm>.
 - 4. The organizations listed in the Section entitled "DBE Goal for this Project" of these special provisions.
- G. Credit for materials or supplies purchased from DBEs will be as follows:
 - 1. If the materials or supplies are obtained from a DBE manufacturer, 100 percent of the cost of the materials or supplies will count toward the DBE goal. A DBE manufacturer is a firm that operates or maintains a factory or

establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract and of the general character described by the specifications.

2. If the materials or supplies are purchased from a DBE regular dealer, 60 percent of the cost of the materials or supplies will count toward the DBE goal. A DBE regular dealer is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. To be a DBE regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question. A person may be a DBE regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business as provided in this paragraph G.2. if the person both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment shall be by a long-term lease agreement and not on an ad hoc or contract-by-contract basis. Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not DBE regular dealers within the meaning of this paragraph G.2.
3. Credit for materials or supplies purchased from a DBE which is neither a manufacturer nor a regular dealer will be limited to the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site, provided the fees are reasonable and not excessive as compared with fees charged for similar services.

H. Credit for DBE trucking companies will be as follows:

1. The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there cannot be a contrived arrangement for the purpose of meeting the DBE goal.
2. The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
3. The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
4. The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.
5. The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by a DBE.
6. For the purposes of this paragraph H, a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

I. Noncompliance by the Contractor with the requirements of the regulations constitutes a breach of this contract and may result in termination of the contract or other appropriate remedy for a breach of this contract.

J. Bidders are encouraged to use services offered by financial institutions owned and controlled by DBEs.

2-1.02A DBE GOAL FOR THIS PROJECT

The Department has established the following goal for Disadvantaged Business Enterprise (DBE) participation for this project:

Disadvantaged Business Enterprise (DBE): 18 percent

Bidders may use the services of the following firms to contact interested DBEs. These firms are available to assist DBEs in preparing bids for subcontracting or supplying materials.

The following firms may be contacted for projects in the following locations:

<p>Districts 04, 05 (except San Luis Obispo and Santa Barbara Counties), 06 (except Kern County) and 10:</p> <p>Triaxial Management Services, Inc. - Oakland</p> <p>1545 Willow Street, 1st Floor Oakland, CA 94607 Telephone - (510) 286-1313 FAX No. - (510) 286-6792</p>	<p>Districts 08, 11 and 12:</p> <p>Triaxial Management Services, Inc. - San Diego 2725 Congress Street, Suite 1-D San Diego, CA 92110 Telephone - (619) 543-5109 FAX No. - (619) 543-5108</p>
<p>Districts 07 and 08; in San Luis Obispo and Santa Barbara Counties in District 05; and in Kern County in District 06:</p> <p>Triaxial Management Services, Inc. - Los Angeles 2594 Industry Way, Suite 101 Lynwood, CA 90262 Telephone - (310) 537-6677 FAX No. - (310) 637-0128</p>	<p>Districts 01, 02, 03 and 09:</p> <p>Triaxial Management Services, Inc. - Sacramento 930 Alhambra Blvd., #205 Sacramento, CA 95816 Telephone - (916) 553-4172 FAX No. - (916) 553-4173</p>

2-1.02B SUBMISSION OF DBE INFORMATION

The required DBE information shall be submitted on the "CALTRANS BIDDER - DBE INFORMATION" form included in the Proposal. If the DBE information is not submitted with the bid, the DBE Information form shall be removed from the documents prior to submitting the bid.

It is the bidder's responsibility to make enough work available to DBEs and to select those portions of the work or material needs consistent with the available DBEs to meet the goal for DBE participation or to provide information to establish that, prior to bidding, the bidder made adequate good faith efforts to do so.

If DBE information is not submitted with the bid, the apparent successful bidder (low bidder), the second low bidder and the third low bidder shall submit DBE information to the Department of Transportation, 1120 N Street, Room 0200, MS #26, Sacramento, California 95814 so the information is received by the Department no later than 4:00 p.m. on the fourth day, not including Saturdays, Sundays and legal holidays, following bid opening. DBE information sent by U.S. Postal Service certified mail with return receipt and certificate of mailing and mailed on or before the third day, not including Saturdays, Sundays and legal holidays, following bid opening will be accepted even if it is received after the fourth day following bid opening. Failure to submit the required DBE information by the time specified will be grounds for finding the bid or proposal nonresponsive. Other bidders need not submit DBE information unless requested to do so by the Department.

The bidder's DBE information shall establish that good faith efforts to meet the DBE goal have been made. To establish good faith efforts, the bidder shall demonstrate that the goal will be met or that, prior to bidding, adequate good faith efforts to meet the goal were made.

Bidders are cautioned that even though their submittal indicates they will meet the stated DBE goal, their submittal should also include their adequate good faith efforts information along with their DBE goal information to protect their eligibility for award of the contract in the event the Department, in its review, finds that the goal has not been met.

The bidder's DBE information shall include the names, addresses and phone numbers of DBE firms that will participate, with a complete description of work or supplies to be provided by each, the dollar value of each DBE transaction, and a written confirmation from the DBE that it is participating in the contract. A copy of the DBE's quote will serve as written confirmation that the DBE is participating in the contract. When 100 percent of a contract item of work is not to be performed or furnished by a DBE, a description of the exact portion of that work to be performed or furnished by that DBE shall be included in the DBE information, including the planned location of that work. The work that a DBE prime contractor has committed to performing with its own forces as well as the work that it has committed to be performed by DBE subcontractors, suppliers and trucking companies will count toward the goal.

The information necessary to establish the bidder's adequate good faith efforts to meet the DBE goal should include:

- A. The names and dates of each publication in which a request for DBE participation for this project was placed by the bidder.
- B. The names and dates of written notices sent to certified DBEs soliciting bids for this project and the dates and methods used for following up initial solicitations to determine with certainty whether the DBEs were interested.
- C. The items of work which the bidder made available to DBE firms, including, where appropriate, any breaking down of the contract work items (including those items normally performed by the bidder with its own forces) into economically feasible units to facilitate DBE participation. It is the bidder's responsibility to demonstrate that sufficient work to meet the DBE goal was made available to DBE firms.
- D. The names, addresses and phone numbers of rejected DBE firms, the firms selected for that work, and the reasons for the bidder's choice.
- E. Efforts made to assist interested DBEs in obtaining bonding, lines of credit or insurance, and any technical assistance or information related to the plans, specifications and requirements for the work which was provided to DBEs.
- F. Efforts made to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services, excluding supplies and equipment the DBE subcontractor purchases or leases from the prime contractor or its affiliate.
- G. The names of agencies contacted to provide assistance in contacting, recruiting and using DBE firms.
- H. Any additional data to support a demonstration of good faith efforts.

SECTION 3. AWARD AND EXECUTION OF CONTRACT

The bidder's attention is directed to the provisions in Section 3, "Award and Execution of Contract," of the Standard Specifications and these special provisions for the requirements and conditions concerning award and execution of contract.

Section 3-1.01, "Award of Contract," of the Standard Specifications is amended to read:

3-1.01 Award of Contract—The right is reserved to reject any and all proposals.

The award of the contract, if it be awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed. Such award, if made, will be made within 30 days after the opening of the proposals. This period will be subject to extension for such further period as may be agreed upon in writing between the Department and the bidder concerned.

All bids will be compared on the basis of the Engineer's Estimate of the quantities of work to be done.

The award of the contract, if it be awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed and who has met the goal for DBE participation or has demonstrated, to the satisfaction of the Department, adequate good faith efforts to do so. Meeting the goal for DBE participation or demonstrating, to the satisfaction of the Department, adequate good faith efforts to do so is a condition for being eligible for award of contract.

A "Payee Data Record" form will be included in the contract documents to be executed by the successful bidder. The purpose of the form is to facilitate the collection of taxpayer identification data. The form shall be completed and returned to the Department by the successful bidder with the executed contract and contract bonds. For the purposes of the form, payee shall be deemed to mean the successful bidder. The form is not to be completed for subcontractors or suppliers. Failure to complete and return the "Payee Data Record" form to the Department as provided herein will result in the retention of 31 percent of payments due the contractor and penalties of up to \$20,000. This retention of payments for failure to complete the "Payee Data Record" form is in addition to any other retention of payments due the Contractor.

SECTION 4. BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES

Attention is directed to the provisions in Sections 8-1.03, "Beginning of Work," 8-1.06, "Time of Completion," 8-1.07, "Liquidated Damages," and 20-4.08, "Plant Establishment Work," of the Standard Specifications and these special provisions.

The Contractor shall begin work within 15 calendar days after the contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Department of Transportation.

The work (except plant establishment work) shall be diligently prosecuted to completion before the expiration of

650 WORKING DAYS

beginning on the fifteenth calendar day after approval of the contract.

The Contractor shall pay to the State of California the sum of \$2,800 per day, for each and every calendar day's delay in finishing the work (except plant establishment work) in excess of the number of working days prescribed above.

The Contractor shall diligently prosecute all work (including plant establishment) to completion before the expiration of

900 WORKING DAYS

beginning on the fifteenth calendar day after approval of the contract.

The Contractor shall pay to the State of California the sum of \$250 per day, for each and every calendar day's delay in completing the work in excess of the number of working days prescribed above.

In no case will liquidated damages of more than \$2,800 per day be assessed.

SECTION 5. GENERAL

SECTION 5-1. MISCELLANEOUS

5-1.00 PLANS AND WORKING DRAWINGS

When the specifications require working drawings to be submitted to the Division of Structure Design, the drawings shall be submitted to: Division of Structure Design, Documents Unit, Mail Station 9, 1801 30th Street, Sacramento, CA 95816, Telephone (916) 227-8252.

5-1.002 LABORATORY

When a reference is made in the specifications to the "Laboratory," the reference shall mean the Division of Materials Engineering and Testing Services and the Division of Structural Foundations of the Department of Transportation, or established laboratories of the various Districts of the Department, or other laboratories authorized by the Department to test materials and work involved in the contract. When a reference is made in the specifications to the "Transportation Laboratory," the reference shall mean the Division of Materials Engineering and Testing Services and the Division of Structural Foundations, located at 5900 Folsom Boulevard, Sacramento, CA 95819, Telephone (916) 227-7000.

5-1.003 EXAMINATION OF PLANS, SPECIFICATIONS, CONTRACT, AND SITE OF WORK

The second paragraph of Section 2-1.03, "Examination of Plans, Specifications, Contract, and Site of Work," of the Standard Specifications is amended to read:

Where the Department has made investigations of site conditions, including subsurface conditions in areas where work is to be performed under the contract, or in other areas, some of which may constitute possible local material sources, bidders or Contractors may, upon written request, inspect the records of the Department as to those investigations subject to and upon the conditions hereinafter set forth.

Attention is directed to "Differing Site Conditions" of these special provisions regarding physical conditions at the site which may differ from those indicated in "Materials Information," log of test borings or other geotechnical information obtained by the Department's investigation of site conditions.

5-1.004 DIFFERING SITE CONDITIONS

Attention is directed to Section 5-1.116, "Differing Site Conditions," of the Standard Specifications.

During the progress of the work, if subsurface or latent conditions are encountered at the site differing materially from those indicated in the "Materials Information," log of test borings, other geotechnical data obtained by the Department's investigation of subsurface conditions, or an examination of the conditions above ground at the site, the party discovering those conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed.

The Contractor will be allowed 15 days from the notification of the Engineer's determination of whether or not an adjustment of the contract is warranted, in which to file a notice of potential claim in conformance with the provisions of Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications and as specified herein; otherwise the decision of the Engineer shall be deemed to have been accepted by the Contractor as correct. The notice of potential claim shall set forth in what respects the Contractor's position differs from the Engineer's determination and provide any additional information obtained by the Contractor, including but not limited to additional geotechnical data. The notice of potential claim shall be accompanied by the Contractor's certification that the following were made in preparation of the bid: a review of the contract, a review of the "Materials Information," a review of the log of test borings and other records of geotechnical data to the extent they were made available to bidders prior to the opening of bids, and an examination of the conditions above ground at the site. Supplementary information, obtained by the Contractor subsequent to the filing of the notice of potential claim, shall be submitted to the Engineer in an expeditious manner.

5-1.005 CONTRACT BONDS

Attention is directed to Section 3-1.02, "Contract Bonds," of the Standard Specifications and these special provisions.

The payment bond shall be in a sum not less than one hundred percent of the total amount payable by the terms of the contract.

5-1.006 EXCAVATION SAFETY PLANS

Section 5-1.02A, "Trench Excavation Safety Plans," of the Standard Specifications is amended to read:

5-1.02A Excavation Safety Plans.--The Construction Safety Orders of the Division of Occupational Safety and Health shall apply to all excavations. For all excavations 1.5 m or more in depth, the Contractor shall submit to the Engineer a detailed plan showing the design and details of the protective systems to be provided for worker protection from the hazard of caving ground during excavation. The detailed plan shall include any tabulated data and any design calculations used in the preparation of the plan. Excavation shall not begin until the detailed plan has been reviewed and approved by the Engineer.

Detailed plans of protective systems for which the Construction Safety Orders require design by a registered professional engineer shall be prepared and signed by an engineer who is registered as a Civil Engineer in the State of California, and shall include the soil classification, soil properties, soil design calculations that demonstrate adequate stability of the protective system, and any other design calculations used in the preparation of the plan.

No plan shall allow the use of a protective system less effective than that required by the Construction Safety Orders.

If the detailed plan includes designs of protective systems developed only from the allowable configurations and slopes, or Appendices, contained in the Construction Safety Orders, the plan shall be submitted at least 5 days before the Contractor intends to begin excavation. If the detailed plan includes designs of protective systems developed from tabulated data, or designs for which design by a registered professional engineer is required, the plan shall be submitted at least 3 weeks before the Contractor intends to begin excavation.

Attention is directed to Section 7-1.01E, "Trench Safety."

The third paragraph of Section 19-1.02, "Preservation of Property," of the Standard Specifications is amended to read:

In addition to the provisions in Sections 5-1.02, "Plans and Working Drawings," and 5-1.02A, "Excavation Safety Plans," detailed plans of the protective systems for excavations on or affecting railroad property will be reviewed for adequacy of protection provided for railroad facilities, property, and traffic. These plans shall be submitted at least 9 weeks before the Contractor intends to begin excavation requiring the protective systems. Approval by the Engineer of the detailed plans for the protective systems will be contingent upon the plans being satisfactory to the railroad company involved.

5-1.007 COST REDUCTION INCENTIVE

Attention is directed to Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications.

Prior to preparing a cost reduction proposal, the Contractor shall request a meeting with the Engineer to discuss the proposal in concept and to determine the merit of the cost reduction proposal. Items of discussion will also include permit issues, impact on other projects, impact on the project schedule, peer reviews, and review times required by the Department and other agencies.

5-1.01 LABOR NONDISCRIMINATION

Attention is directed to the following Notice that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations.

NOTICE OF REQUIREMENT FOR NONDISCRIMINATION PROGRAM (GOV. CODE, SECTION 12990)

Your attention is called to the "Nondiscrimination Clause", set forth in Section 7-1.01A(4), "Labor Nondiscrimination," of the Standard Specifications, which is applicable to all nonexempt state contracts and subcontracts, and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth therein. The Specifications are applicable to all nonexempt state construction contracts and subcontracts of \$5,000 or more.

5-1.02 LABOR CODE REQUIREMENTS

Section 7-1.01A(1), "Hours of Labor," of the Standard Specifications is amended to read:

7-1.01A(1) Hours of Labor.— Eight hours labor constitutes a legal day's work. The Contractor or any subcontractor under the Contractor shall forfeit, as a penalty to the State of California, \$25 for each worker employed in the execution of the contract by the respective Contractor or subcontractor for each calendar day during which that worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of the Labor Code, and in particular, Section 1810 to Section 1815, thereof, inclusive, except that work performed by employees of Contractors in excess of 8 hours per day, and 40 hours during any one week, shall be permitted upon compensation for all hours worked in excess of 8 hours per day at not less than one and one-half times the basic rate of pay, as provided in Section 1815 thereof.

Section 7-1.01A(2), "Prevailing Wage," of the Standard Specifications is amended to read:

7-1.01A(2) Prevailing Wage.— The Contractor and any subcontractor under the Contractor shall comply with Labor Code Sections 1774 and 1775. Pursuant to Section 1775, the Contractor and any subcontractor under the Contractor shall forfeit to the State or political subdivision on whose behalf the contract is made or awarded a penalty of not more than fifty dollars (\$50) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates as determined by the Director of Industrial Relations for the work or craft in which the worker is employed for any public work done under the contract by the Contractor or by any subcontractor under the Contractor in violation of the provisions of the Labor Code and in particular, Labor Code Sections 1770 to 1780, inclusive. The amount of this forfeiture shall be determined by the Labor Commissioner and shall be based on consideration of the mistake, inadvertence, or neglect of the Contractor or subcontractor in failing to pay the correct rate of prevailing wages, or the previous record of the Contractor or subcontractor in meeting their respective prevailing wage obligations, or the willful failure by the Contractor or subcontractor to pay the correct rates of prevailing wages. A mistake, inadvertence, or neglect in failing to pay the correct rate of prevailing wages is not excusable if the Contractor or subcontractor had knowledge of the obligations under the Labor Code. In addition to the penalty and pursuant to Labor Code Section 1775, the difference between the prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by the Contractor or subcontractor. If a worker employed by a subcontractor on a public works project is not paid the general prevailing per diem wages by the subcontractor, the prime contractor of the project is not liable for the penalties described above unless the prime contractor had knowledge of that failure of the subcontractor to pay the specified prevailing rate of wages to those workers or unless the prime contractor fails to comply with all of the following requirements:

1. The contract executed between the contractor and the subcontractor for the performance of work on the public works project shall include a copy of the provisions of Sections 1771, 1775, 1776, 1777.5, 1813, and 1815 of the Labor Code.
2. The contractor shall monitor the payment of the specified general prevailing rate of per diem wages by the subcontractor to the employees, by periodic review of the certified payroll records of the subcontractor.
3. Upon becoming aware of the subcontractor's failure to pay the specified prevailing rate of wages to the subcontractor's workers, the contractor shall diligently take corrective action to halt or rectify the failure, including, but not limited to, retaining sufficient funds due the subcontractor for work performed on the public works project.
4. Prior to making final payment to the subcontractor for work performed on the public works project, the contractor shall obtain an affidavit signed under penalty of perjury from the subcontractor that the subcontractor has paid the specified general prevailing rate of per diem wages to the subcontractor's employees on the public works project and any amounts due pursuant to Section 1813 of the Labor Code.

Pursuant to Section 1775 of the Labor Code, the Division of Labor Standards Enforcement shall notify the Contractor on a public works project within 15 days of the receipt by the Division of Labor Standards Enforcement of a complaint of the failure of a subcontractor on that public works project to pay workers the general prevailing rate of per diem wages. If the Division of Labor Standards Enforcement determines that employees of a subcontractor were not paid the general prevailing rate of per diem wages and if the Department did not retain sufficient money under the contract to pay those employees the balance of wages owed under the general prevailing rate of per diem wages, the contractor shall withhold an amount of moneys due the subcontractor sufficient to pay those employees the general prevailing rate of per diem wages if requested by the Division of Labor Standards Enforcement. The Contractor shall pay any money retained from and owed to a subcontractor upon receipt of notification by the Division of Labor

Standards Enforcement that the wage complaint has been resolved. If notice of the resolution of the wage complaint has not been received by the Contractor within 180 days of the filing of a valid notice of completion or acceptance of the public works project, whichever occurs later, the Contractor shall pay all moneys retained from the subcontractor to the Department. These moneys shall be retained by the Department pending the final decision of an enforcement action.

Pursuant to the provisions of Section 1773 of the Labor Code, the Department has obtained the general prevailing rate of wages (which rate includes employer payments for health and welfare, pension, vacation, travel time, and subsistence pay as provided for in Section 1773.8 of the Labor Code, apprenticeship or other training programs authorized by Section 3093 of the Labor Code, and similar purposes) applicable to the work to be done, for straight time, overtime, Saturday, Sunday and holiday work. The holiday wage rate listed shall be applicable to all holidays recognized in the collective bargaining agreement of the particular craft, classification or type of workmen concerned. The general prevailing wage rates and any applicable changes to these wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated. For work situated in District 9, the wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for District 6, located at Fresno. General prevailing wage rates are also available from the California Department of Industrial Relations' Internet Web Site at: <http://www.dir.ca.gov>.

The wage rates determined by the Director of Industrial Relations for the project refer to expiration dates. Prevailing wage determinations with a single asterisk after the expiration date are in effect on the date of advertisement for bids and are good for the life of the contract. Prevailing wage determinations with double asterisks after the expiration date indicate that the wage rate to be paid for work performed after this date has been determined. If work is to extend past this date, the new rate shall be paid and incorporated in the contract. The Contractor shall contact the Department of Industrial Relations as indicated in the wage rate determinations to obtain predetermined wage changes.

Pursuant to Section 1773.2 of the Labor Code, general prevailing wage rates shall be posted by the Contractor at a prominent place at the site of the work.

Changes in general prevailing wage determinations which conform to Labor Code Section 1773.6 and Title 8 California Code of Regulations Section 16204 shall apply to the project when issued by the Director of Industrial Relations at least 10 days prior to the date of the Notice to Contractors for the project.

The State will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rate set forth in the contract. The possibility of wage increases is one of the elements to be considered by the Contractor in determining the bid, and will not under any circumstances be considered as the basis of a claim against the State on the contract.

7-1.01A(2)(a) Travel and Subsistence Payments.— Attention is directed to the requirements of Section 1773.8 of the Labor Code. The Contractor shall make travel and subsistence payments to each workman, needed to execute the work, in accordance with the requirements in Labor Code Section 1773.8.

The first and second paragraphs of Section 7-1.01A(3), "Payroll Records," of the Standard Specifications are amended to read:

7-1.01A(3) Payroll Records.— Attention is directed to the provisions of Labor Code Section 1776, a portion of which is quoted below. Regulations implementing Labor Code Section 1776 are located in Sections 16016 through 16019 and Sections 16207.10 through 16207.19 of Title 8, California Code of Regulations.

"1776. (a) Each contractor and subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:

(1) The information contained in the payroll record is true and correct.

(2) The employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project.

"(b) The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the contractor on the following basis:

(1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.

(2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the body awarding the contract, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.

(3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through either the body awarding the contract, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the contractor, subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the contractor.

"(c) The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.

"(d) A contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested the records within 10 days after receipt of a written request.

"(e) Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated in a manner so as to prevent disclosure of an individual's name, address, and social security number. The name and address of the contractor awarded the contract or the subcontractor performing the contract shall not be marked or obliterated.

"(f) The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

"(g) The contractor or subcontractor shall have 10 days in which to comply subsequent to receipt of a written notice requesting the records enumerated in subdivision (a). In the event that the contractor or subcontractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars (\$25) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of a subcontractor to comply with this section."

The penalties specified in subdivision (g) of Labor Code Section 1776 for noncompliance with the provisions of Section 1776 may be deducted from any moneys due or which may become due to the Contractor.

5-1.03 CONTRACTOR'S LICENSING LAWS

The third paragraph of Section 7-1.01C, "Contractor's Licensing Laws," of the Standard Specifications is amended to read:

Attention is also directed to the requirements in Public Contract Code Section 10164. In all projects where Federal funds are involved, the Contractor shall be properly licensed at the time the contract is awarded.

5-1.035 INDEMNIFICATION AND INSURANCE

Section 7-1.12, "Responsibility for Damage," of the Standard Specifications is deleted.

The Standard Specifications is amended by adding the following Section 7-1.121, "Indemnification," and Section 7-1.122, "Insurance," before Section 7-1.125, "Legal Action Against the Department."

7-1.121 Indemnification.—With the exception that this section shall in no event be construed to require indemnification by the Contractor to a greater extent than permitted by law, the Contractor shall defend, indemnify and save harmless the State, including its officers, directors, agents (excluding agents who are design professionals), and employees, and each of them (Indemnitees), from any and all claims, demands, causes of action, damages, costs, expenses, actual attorneys' fees, losses or liabilities, in law or in equity, of every kind and nature whatsoever (Claims), arising out of or in connection with the Contractor's performance of this contract for:

- A. Bodily injury including, but not limited to, bodily injury, sickness or disease, emotional injury or death to persons, including, but not limited to, the public, any employees or agents of the Contractor, State, Department, or any other contractor and;
- B. Damage to property of anyone including loss of use thereof;

caused or alleged to be caused in whole or in part by any negligent or otherwise legally actionable act or omission of the Contractor or anyone directly or indirectly employed by the Contractor or anyone for whose acts the Contractor may be liable.

Except as otherwise provided by law, the indemnification provisions above shall apply regardless of the existence or degree of fault of Indemnitees. The Contractor, however, shall not be obligated to indemnify Indemnitees for Claims arising from conduct delineated in Civil Code section 2782. Further, the Contractor's indemnity obligation shall not extend to Claims to the extent they arise from any defective or substandard condition of the roadway which existed at or prior to the time the Contractor commenced work, unless this condition has been changed by the work or the scope of the work requires the Contractor to maintain existing Roadway facilities and the claim arises from the Contractor's failure to maintain. The Contractor's indemnity obligation shall extend to Claims arising after the work is completed and accepted only if these Claims are directly related to alleged acts or omissions of the Contractor which occurred during the course of the work. No inspection by the Department, its employees or agents shall be deemed a waiver by the Department of full compliance with the requirements of this section.

The Contractor's obligation to defend and indemnify shall not be excused because of the Contractor's inability to evaluate liability or because the Contractor evaluates liability and determines that the Contractor is not liable to the claimant. The Contractor will respond within 30 days to the tender of any claim for defense and indemnity by the State, unless this time has been extended by the State. If the Contractor fails to accept or reject a tender of defense and indemnity within 30 days, in addition to any other remedy authorized by law, so much of the money due the Contractor under and by virtue of the contract as shall reasonably be considered necessary by the Department, may be retained by the State until disposition has been made of the claim or suit for damages, or until the Contractor accepts or rejects the tender of defense, whichever occurs first.

With respect to third party claims against the Contractor, the Contractor waives any and all rights of any type to express or implied indemnity against the State, its directors, officers, employees, or agents (excluding agents who are design professionals).

7-1.122 Insurance.—Insurance shall conform to the following requirements:

7-1.122A Casualty Insurance.—The Contractor shall, at the Contractor's expense, procure and maintain insurance on all of its operations with companies acceptable to the Department as follows. All insurance shall be kept in full force and effect from the beginning of the work through final acceptance by the State. In addition, the Contractor shall maintain completed operations coverage with a carrier acceptable to the Department through the expiration of the patent deficiency in construction statute of repose set forth in Section 337.1 of the Code of Civil Procedure.

7-1.122A(1) Workers' Compensation and Employer's Liability Insurance.—Workers' Compensation insurance shall be provided as specified in Section 7-1.01A(6), "Workers' Compensation." Employer's Liability Insurance shall be provided in amounts not less than:

- (a) \$1,000,000 for each accident for bodily injury by accident.
- (b) \$1,000,000 policy limit for bodily injury by disease.
- (c) \$1,000,000 for each employee for bodily injury by disease.

If there is an exposure of injury to the Contractors' employees under the U.S. Longshoremen's and Harbor Workers' Compensation Act, the Jones Act or under laws, regulations or statutes applicable to maritime employees, coverage shall be included for such injuries or claims.

7-1.122A(2) Liability Insurance.—The Contractor shall carry General Liability and Umbrella or Excess Liability Insurance covering all operations by or on behalf of the Contractor providing insurance for bodily injury liability, and property damage liability for the limits of liability indicated below and including coverage for:

- (a) premises, operations and mobile equipment
- (b) products and completed operations
- (c) broad form property damage (including completed operations)
- (d) explosion, collapse and underground hazards
- (e) personal injury
- (f) contractual liability

7-1.122A(3) Liability Limits/Additional Insureds.—The limits of liability shall be at least:

- (a) \$1,000,000 for each occurrence (combined single limit for bodily injury and property damage).
- (b) \$2,000,000 aggregate for products-completed operations.
- (c) \$2,000,000 general aggregate. This general aggregate limit shall apply separately to the Contractor's work under this Agreement.
- (d) \$5,000,000 umbrella or excess liability. For projects over \$25,000,000 only, an additional \$10,000,000 umbrella or excess liability (for a total of \$15,000,000). Umbrella or excess policy shall include products liability completed operations coverage and may be subject to \$5,000,000 or \$15,000,000 aggregate limits. Further, the umbrella or excess policy shall contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

The State and the Department, including their officers, directors, agents (excluding agents who are design professionals), and State employees, shall be named as additional insureds under the General Liability and Umbrella Liability Policies with respect to liability arising out of or connected with work or operations performed by or on behalf of the Contractor under this contract. Coverage for such additional insureds shall not extend to liability:

- (1) arising from any defective or substandard condition of the Roadway which existed at or prior to the time the Contractor commenced work, unless such condition has been changed by the work or the scope of the work requires the Contractor to maintain existing Roadway facilities and the claim arises from the Contractor's failure to maintain; or
- (2) for claims occurring after the work is completed and accepted unless these claims are directly related to alleged acts or omissions of the Contractor which occurred during the course of the work; or
- (3) to the extent prohibited by Section 11580.04 of the Insurance Code.

The policy shall stipulate that the insurance afforded the additional insureds shall apply as primary insurance. Any other insurance or self insurance maintained by the Department or State will be excess only and shall not be called upon to contribute with this insurance. Such additional insured coverage shall be provided by a policy provision or by an endorsement providing coverage at least as broad as Additional Insured (Form B) endorsement form CG 1010, as published by the Insurance Services Office (ISO).

7-1.122B Automobile Liability Insurance.—The Contractor shall carry automobile liability insurance, including coverage for all owned, hired and non-owned automobiles. The primary limits of liability shall be not less than \$1,000,000 combined single limit each accident for bodily injury and property damage. The umbrella or excess liability coverage required under Section 7-1.122A(3), "Liability Limits/Additional Insureds," shall also apply to automobile liability.

7-1.122C Policy Forms, Endorsements and Certificates.—The Contractor's General Liability Insurance shall be provided under Commercial General Liability policy form no. CG0001 as published by the Insurance Services Office (ISO) or under a policy form at least as broad as policy form no. CG0001.

Evidence of insurance in a form acceptable to the Department, including the required "additional insured" endorsements, shall be furnished by the Contractor to the Department at or prior to the pre-construction conference. The evidence of insurance shall provide that there will be no cancellation, lapse, or reduction of coverage without thirty (30) days' prior written notice to the Department. Certificates of Insurance, as evidence of required insurance, for the General Liability, Auto Liability and Umbrella-Excess Liability policies shall set forth deductible amounts applicable to each policy and all exclusions which are added by endorsement to each policy. The Department may expressly allow deductible clauses, which it does not consider excessive, overly broad, or harmful to the interests of the State. Standard ISO form CG 0001 or similar exclusions will be allowed provided they are not inconsistent with the requirements of this section. Allowance of any additional exclusions is at the discretion of the Department. Regardless of the allowance of exclusions or deductions by the Department, the Contractor shall be responsible for any deductible amount and shall warrant that the coverage provided to the Department is consistent with the requirements of this section.

7-1.122D Enforcement.—The Department may take any steps as are necessary to assure Contractor's compliance with its obligations. Should any insurance policy lapse or be canceled during the contract period the Contractor shall, within thirty (30) days prior to the effective expiration or cancellation date, furnish the Department with evidence of renewal or replacement of the policy. Failure to continuously maintain insurance coverage as herein provided is a material breach of contract. In the event the Contractor fails to maintain any insurance coverage required, the Department may, but is not required to, maintain this coverage and charge the expense to the Contractor or terminate this Agreement. The required insurance shall be subject to the approval of Department, but any acceptance of insurance certificates by the Department shall in no way limit or relieve the Contractor of the Contractor's duties and responsibilities under the Contract to indemnify, defend and hold harmless the State, its officers, agents, and employees. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve the Contractor for liability in excess of such coverage, nor shall it preclude the State from taking other actions as is available to it under any other provision of the contract or law. Failure of the Department to enforce in a timely manner any of the provisions of this section shall not act as a waiver to enforcement of any of these provisions at a later date.

7-1.122E Self-Insurance.—Self-insurance programs and self-insured retentions in insurance policies are subject to separate annual review and approval by the State of evidence of the Contractor's financial capacity to respond. Additionally, self-insurance programs or retentions must provide the State with at least the same protection from liability and defense of suits as would be afforded by first-dollar insurance.

7-1.122F Miscellaneous.—Nothing contained in the Contract is intended to make the public or any member thereof a third party beneficiary of the Insurance or Indemnity provisions of these Standard Specifications, nor is any term, condition or other provision of the Contract intended to establish a standard of care owed to the public or any member thereof.

5-1.04 ARBITRATION

The last paragraph in Section 9-1.10, "Arbitration," of the Standard Specifications is amended to read:

Arbitration shall be initiated by a Complaint in Arbitration made in compliance with the requirements of those regulations. A Complaint in Arbitration by the Contractor shall be made not later than 90 days after the date of service in person or by mail on the Contractor of the final written decision by the Department on the claim.

5-1.05 NOTICE OF POTENTIAL CLAIM

Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications is amended to read:

9-1.04 Notice of Potential Claim.—The Contractor shall not be entitled to the payment of any additional compensation for any act, or failure to act, by the Engineer, including failure or refusal to issue a change order, or for the happening of any event, thing, occurrence, or other cause, unless he shall have given the Engineer due written notice of potential claim as hereinafter specified. Compliance with this Section 9-1.04 shall not be a prerequisite as to matters within the scope of the protest provisions in Section 4-1.03, "Changes," or Section 8-1.06, "Time of Completion," or the notice provisions in Section 5-1.116, "Differing Site Conditions," or Section 8-1.07, "Liquidated Damages," or Section 8-1.10, "Utility and Non-Highway Facilities," nor to any claim which is based on differences in measurements or errors of computation as to contract quantities.

The written notice of potential claim shall be submitted to the Engineer prior to the time that the Contractor performs the work giving rise to the potential claim for additional compensation, if based on an act or failure to act by the Engineer, or in all other cases within 15 days after the happening of the event, thing, occurrence, or other cause, giving rise to the potential claim.

The written notice of potential claim shall be submitted on Form CEM-6201 furnished by the Department and shall be certified with reference to the California False Claims Act, Government Code Sections 12650 - 12655. The notice shall set forth the reasons for which the Contractor believes additional compensation will or may be due and the nature of the costs involved. Unless the amount of the potential claim has been stated in the written notice, the Contractor shall, within 15 days of submitting said notice, furnish an estimate of the cost of the affected work and impacts, if any, on project completion. Said estimate of costs may be changed or updated by the Contractor when conditions have changed. When the affected work is completed, the Contractor shall submit substantiation of his actual costs. Failure to do so shall be sufficient cause for denial of any claim subsequently filed on the basis of said notice of potential claim.

It is the intention of this Section 9-1.04 that differences between the parties arising under and by virtue of the contract be brought to the attention of the Engineer at the earliest possible time in order that such matters may be settled, if possible, or other appropriate action promptly taken. The Contractor hereby agrees that he shall have no right to

additional compensation for any claim that may be based on any such act, failure to act, event, thing or occurrence for which no written notice of potential claim as herein required was filed.

Should the Contractor, in connection with or subsequent to the assertion of a potential claim, request inspection and copying of documents or records in the possession of the Department that pertain to the potential claim, Contractor shall make its records of the project, as deemed by the Department to be pertinent to the potential claim, available to the Department for inspection and copying.

5-1.06 PARTIAL PAYMENTS

The last paragraph of Section 9-1.06, "Partial Payments," of the Standard Specifications is amended to read:

Attention is directed to the prohibitions and penalties pertaining to unlicensed contractors as provided in Business and Professions Code Sections 7028.15(a) and 7031.

5-1.07 PAYMENT OF WITHHELD FUNDS

Section 9-1.065, "Payment of Withheld Funds," of the Standard Specifications, is amended by adding the following after the third paragraph:

Alternatively, and subject to the approval of the Department, the payment of retentions earned may be deposited directly with a person licensed under Division 6 (commencing with Section 17000) of the Financial Code as the escrow agent. Upon written request of an escrow agent that has not been approved by the Department under subdivision (c) of Section 10263 of the Public Contract Code, the Department will provide written notice to that escrow agent within 10 business days of receipt of the request indicating the reason or reasons for not approving that escrow agent. The payments will be deposited in a trust account with a Federally chartered bank or savings association within 24 hours of receipt by the escrow agent. The Contractor shall not place any retentions with the escrow agent in excess of the coverage provided to that escrow agent pursuant to subdivision (b) of Section 17314 of the Financial Code. In all respects not inconsistent with subdivision (c) of Section 10263 of the Public Contract Code, the remaining provisions of Section 10263 of the Public Contract Code shall apply to escrow agents acting pursuant to subdivision (c) of Section 10263 of the Public Contract Code.

5-1.08 FINAL PAYMENT AND CLAIMS

Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications is amended to read:

9-1.07B Final Payment and Claims.--After acceptance by the Director, the Engineer will make a proposed final estimate in writing of the total amount payable to the Contractor, including therein an itemization of said amount, segregated as to contract item quantities, extra work and any other basis for payment, and shall also show therein all deductions made or to be made for prior payments and amounts to be kept or retained under the provisions of the contract. All prior estimates and payments shall be subject to correction in the proposed final estimate. The Contractor shall submit written approval of the proposed final estimate or a written statement of all claims arising under or by virtue of the contract so that the Engineer receives such written approval or statement of claims no later than close of business of the thirtieth day after receiving the proposed final estimate. If the thirtieth day falls on a Saturday, Sunday or legal holiday, then receipt of such written approval or statement of claims by the Engineer shall not be later than close of business of the next business day. No claim will be considered that was not included in the written statement of claims, nor will any claim be allowed as to which a notice or protest is required under the provisions in Sections 4-1.03, "Changes," 8-1.06, "Time of Completion," 8-1.07, "Liquidated Damages," 5-1.116, "Differing Site Conditions," 8-1.10, "Utility and Non-Highway Facilities," and 9-1.04, "Notice of Potential Claim," unless the Contractor has complied with the notice or protest requirements in said sections.

On the Contractor's approval, or if he files no claim within said period of 30 days, the Engineer will issue a final estimate in writing in accordance with the proposed final estimate submitted to the Contractor and within 30 days thereafter the State will pay the entire sum so found to be due. Such final estimate and payment thereon shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except as otherwise provided in Sections 9-1.03C, "Records," and 9-1.09, "Clerical Errors."

If the Contractor within said period of 30 days files claims, the Engineer will issue a semifinal estimate in accordance with the proposed final estimate submitted to the Contractor and within 30 days thereafter the State will pay the sum so found to be due. Such semifinal estimate and payment thereon shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except insofar as affected by the claims filed within the time and in the manner required hereunder and except as otherwise provided in Sections 9-1.03C, "Records," and 9-1.09, "Clerical Errors."

Claims filed by the Contractor shall be in sufficient detail to enable the Engineer to ascertain the basis and amount of said claims. If additional information or details are required by the Engineer to determine the basis and amount of said claims, the Contractor shall furnish such further information or details so that the information or details are received by the Engineer no later than the fifteenth day after receipt of the written request from the Engineer. If the fifteenth day falls on a Saturday, Sunday or legal holiday, then receipt of such information or details by the Engineer shall not be later than close of business of the next business day. Failure to submit such information and details to the Engineer within the time specified will be sufficient cause for denying the claim.

The Contractor shall keep full and complete records of the costs and additional time incurred for any work for which a claim for additional compensation is made. The Engineer or any designated claim investigator or auditor shall have access to those records and any other records as may be required by the Engineer to determine the facts or contentions involved in the claims. Failure to permit access to such records shall be sufficient cause for denying the claims.

Claims submitted by the Contractor shall be accompanied by a notarized certificate containing the following language:

Under the penalty of law for perjury or falsification and with specific reference to the California False Claims Act, Government Code Section 12650 et. seq., the undersigned,

(name) _____ of

(title)

(company)

hereby certifies that the claim for the additional compensation and time, if any, made herein for the work on this contract is a true statement of the actual costs incurred and time sought, and is fully documented and supported under the contract between parties.

Dated _____

/s/ _____

Subscribed and sworn before me this _____ day

of _____

Notary Public
My Commission Expires _____

Failure to submit the notarized certificate will be sufficient cause for denying the claim.

Any claim for overhead type expenses or costs, in addition to being certified as stated above, shall be supported by an audit report of an independent Certified Public Accountant. Any such overhead claim shall also be subject to audit by the State at its discretion.

Any costs or expenses incurred by the State in reviewing or auditing any claims that are not supported by the Contractor's cost accounting or other records shall be deemed to be damages incurred by the State within the meaning of the California False Claims Act.

If the Contractor files a timely written statement of claims in response to the proposed final estimate, the District that administers the contract will submit a claim position letter to the Contractor by hand delivery or deposit in the U.S. mail within 135 days of acceptance of the contract. The claim position letter will delineate the District's position on the Contractor's claims. If the Contractor disagrees with the claim position letter, the Contractor shall submit a written notification of its disagreement to be received by the District not later than 15 days after the Contractor's receipt of the claim position letter. The written notification of disagreement shall set forth the basis for the Contractor's disagreement and be submitted to the office designated in the claim position letter. The Contractor's failure to provide a timely, written notification of disagreement shall constitute the Contractor's acceptance and agreement with the determinations provided in the claim position letter and with final payment pursuant to the claim position letter.

If the Contractor files a timely notification of disagreement with the District claim position letter, the review board designated by the District Director to review claims that remain in dispute will meet with the Contractor within 45 days

after receipt by the District of the notification of disagreement. Attendance by the Contractor at the board of review meeting shall be mandatory.

If the District fails to submit a claim position letter to the Contractor within 135 days after the acceptance of the contract and the Contractor has claims that remain in dispute, the Contractor may request a meeting with the person or board designated by the District Director to review claims that remain in dispute. The Contractor's request for a meeting shall identify the claims that remain in dispute. If the Contractor files a request for a review meeting, the review person or board will meet with the Contractor within 45 days after the District receives the request for the meeting. Attendance by the Contractor at the District Director's board of review meeting shall be mandatory.

Failure of the Contractor to file a timely written statement of claims in response to the proposed final estimate, or to file a timely notification of disagreement with the District claim position letter, or to attend the District Director's board of review meeting shall constitute a failure to pursue diligently and exhaust the administrative procedures in the contract and shall be a bar to arbitration in conformance with the requirements in Section 10240.2 of the California Public Contract Code.

Upon final determination of the claims, the Engineer will then make and issue his final estimate in writing and within 30 days thereafter the State will pay the entire sum, if any, found due thereon. Such final estimate shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except as otherwise provided in Sections 9-1.03C, "Records," and 9-1.09, "Clerical Errors."

5-1.09 INTEREST ON PAYMENTS

Interest shall be payable on progress payments, payments after acceptance, final payments, extra work payments and claim payments as follows:

1. Unpaid progress payments, payment after acceptance and final payments shall begin to accrue interest 30 days after the Engineer prepares the payment estimate.
2. Unpaid extra work bills shall begin to accrue interest 30 days after preparation of the first pay estimate following the receipt of a properly submitted and undisputed extra work bill. To be properly submitted, the bill must be submitted within 7 days of the performance of the extra work and in accordance with the requirements of Section 9-1.03C, "Records," and Section 9-1.06, "Partial Payments," of the Standard Specifications. An undisputed extra work bill not submitted within 7 days of performance of the extra work will begin to accrue interest 30 days after the preparation of the second pay estimate following submittal of the bill.
3. The rate of interest payable for unpaid progress payments, payments after acceptance, final payments and extra work payments shall be 10 percent per annum.
4. The rate of interest payable on a claim, protest or dispute ultimately allowed under this contract shall be 6 percent per annum. Interest shall begin to accrue 61 days after the Contractor submits to the Engineer information in sufficient detail to enable the Engineer to ascertain the basis and amount of said claim, protest or dispute.

The rate of interest payable on any award in arbitration shall be 6 percent per annum if allowed under the provisions of Civil Code Section 3289.

5-1.10 PUBLIC SAFETY

The Contractor shall provide for the safety of traffic and the public in accordance with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications and these special provisions.

The Contractor shall install temporary railing (Type K) between any lane carrying public traffic and any excavation, obstacle, or storage area when the following conditions exist:

- (1) Excavations.--Any excavation, the near edge of which is 12 feet or less from the edge of the lane, except:
 - (a) Excavations covered with sheet steel or concrete covers of adequate thickness to prevent accidental entry by traffic or the public.
 - (b) Excavations less than one foot deep.
 - (c) Trenches less than one foot wide for irrigation pipe or electrical conduit, or excavations less than one foot in diameter.
 - (d) Excavations parallel to the lane for the purpose of pavement widening or reconstruction.
 - (e) Excavations in side slopes, where the slope is steeper than 4:1.
 - (f) Excavations protected by existing barrier or railing.

(2) Temporarily Unprotected Permanent Obstacles.--Whenever the work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing, and the Contractor elects to install the obstacle prior to installing the protective system; or whenever the Contractor, for his convenience and with permission of the Engineer, removes a portion of an existing protective railing at an obstacle and does not replace such railing complete in place during the same day.

(3) Storage Areas.--Whenever material or equipment is stored within 12 feet of the lane and such storage is not otherwise prohibited by the specifications.

The approach end of temporary railing (Type K), installed in accordance with the requirements in this section "Public Safety" and in Section 7-1.09, "Public Safety," of the Standard Specifications shall be offset a minimum of 15 feet from the edge of the traffic lane open to public traffic. The temporary railing shall be installed on a skew toward the edge of the traffic lane of not more than one foot transversely to 10 feet longitudinally with respect to the edge of the traffic lane. If the 15-foot minimum offset cannot be achieved, the temporary railing shall be installed on the 10 to 1 skew to obtain the maximum available offset between the approach end of the railing and the edge of the traffic lane, and an array of temporary crash cushion modules shall be installed at the approach end of the temporary railing.

Temporary railing (Type K) shall conform to the provisions in Section 12-3.08, "Temporary Railing (Type K)," of the Standard Specifications. Temporary railing (Type K), conforming to the details shown on 1995 Standard Plan T3 or 1997 Standard Plan T3, may be used. Temporary railing (Type K) fabricated prior to January 1, 1993, and conforming to 1988 Standard Plan B11-30 may be used, provided the fabrication date is printed on the required Certificate of Compliance.

The fourteenth paragraph of Section 12-3.08, "Temporary Railing (Type K)," of the Standard Specifications is amended to read:

Each rail unit placed within 10 feet of a traffic lane shall have a reflector installed on top of the rail as directed by the Engineer. A Type P marker panel shall also be installed at each end of railing installed adjacent to a two-lane, two-way highway and at the end facing traffic of railing installed adjacent to a one-way roadbed. If the railing is placed on a skew, the marker shall be installed at the end of the skew nearest the traveled way. Type P marker panels shall conform to the provisions in Section 82, "Markers and Delineators," except that the Contractor shall furnish the marker panels.

Reflectors on temporary railing (Type K) shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials," of these special provisions.

Temporary crash cushion modules shall conform to the provisions in "Temporary Crash Cushion Module" elsewhere in these special provisions.

Except for installing, maintaining and removing traffic control devices, whenever work is performed or equipment is operated in the following work areas the Contractor shall close the adjacent traffic lane unless otherwise provided in the specifications:

Approach speed of public traffic (Posted Limit) (Miles Per Hour)	Work Areas
Over 45	Within 6 feet of a traffic lane but not on a traffic lane.
35 to 45	Within 3 feet of a traffic lane but not on a traffic lane.

The lane closure provisions of this section shall not apply if the work area is protected by permanent or temporary railing or barrier.

When traffic cones or delineators are used to delineate a temporary edge of traffic lane, the line of cones or delineators shall be considered to be the edge of traffic lane, however, the Contractor shall not reduce the width of an existing lane to less than 10 feet without written approval from the Engineer.

When work is not in progress on a trench or other excavation that required closure of an adjacent lane, the traffic cones or portable delineators used for the lane closure shall be placed off of and adjacent to the edge of the traveled way. The spacing of the cones or delineators shall be not more than the spacing used for the lane closure.

Suspended loads or equipment shall not be moved nor positioned over public traffic or pedestrians.

Full compensation for conforming to the requirements in this section "Public Safety," including furnishing and installing temporary railing (Type K) and temporary crash cushion modules, shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

5-1.11 SURFACE MINING AND RECLAMATION ACT

Attention is directed to the Surface Mining and Reclamation Act of 1975, commencing in Public Resources Code, Mining and Geology, Section 2710, which establishes regulations pertinent to surface mining operations, and to California Public Contract Code Section 10295.5.

Material from mining operations furnished for this project shall only come from permitted sites in compliance with California Public Contract Code Section 10295.5.

The requirements of this section shall apply to all materials furnished for the project, except for acquisition of materials in conformance with Section 4-1.05, "Use of Materials Found on the Work," of the Standard Specifications.

5-1.12 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES

When the presence of asbestos or hazardous substances are not shown on the plans or indicated in the specifications and the Contractor encounters materials which the Contractor reasonably believes to be asbestos or a hazardous substance as defined in Section 25914.1 of the Health and Safety Code, and the asbestos or hazardous substance has not been rendered harmless, the Contractor may continue work in unaffected areas reasonably believed to be safe, and shall immediately cease work in the affected area and report the condition to the Engineer in writing.

In accordance with Section 25914.1 of the Health and Safety Code, all such removal of asbestos or hazardous substances including any exploratory work to identify and determine the extent of the asbestos or hazardous substance will be performed by separate contract.

If delay of work in the area delays the current controlling operation, the delay will be considered a right of way delay and the Contractor will be compensated for the delay as provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

5-1.13 FINAL PAY QUANTITIES

Section 9-1.015, "Final Pay Quantities," of the Standard Specifications is amended to read:

9-1.015 Final Pay Items.—When an item of work is designated as (F) or (S-F) in the Engineer's Estimate, the estimated quantity for that item of work shall be the final pay quantity, unless the dimensions of any portion of that item are revised by the Engineer, or the item or any portion of the item is eliminated. If the dimensions of any portion of the item are revised, and the revisions result in an increase or decrease in the estimated quantity of that item of work, the final pay quantity for the item will be revised in the amount represented by the changes in the dimensions, except as otherwise provided for minor structures in Section 51-1.22, "Measurement." If a final pay item is eliminated, the estimated quantity for the item will be eliminated. If a portion of a final pay item is eliminated, the final pay quantity will be revised in the amount represented by the eliminated portion of the item of work.

The estimated quantity for each item of work designated as (F) or (S-F) in the Engineer's Estimate shall be considered as approximate only, and no guarantee is made that the quantity which can be determined by computations, based on the details and dimensions shown on the plans, will equal the estimated quantity. No allowance will be made in the event that the quantity based on computations does not equal the estimated quantity.

In case of discrepancy between the quantity shown in the Engineer's Estimate for a final pay item and the quantity or summation of quantities for the same item shown on the plans, payment will be based on the quantity shown in the Engineer's Estimate.

5-1.14 YEAR 2000 COMPLIANCE

This contract is subject to Year 2000 Compliance for automated devices in the State of California. Year 2000 compliance is defined as follows:

Year 2000 compliance for automated devices in the State of California is achieved when embedded functions have or create no logical or mathematical inconsistencies when dealing with dates prior to and beyond 1999. The year 2000 is recognized and processed as a leap year. The product must also operate accurately in the manner in which it was intended for date operation without requiring manual intervention.

The Contractor shall provide the Engineer a Certificate of Compliance from the manufacturer in accordance with the provisions of Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for all automated devices furnished for the project.

5-1.145 BUY AMERICA REQUIREMENTS

Attention is directed to the "Buy America" requirements of the Surface Transportation Assistance Act of 1982 (Section 165) and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) Sections 1041(a) and 1048(a), and the regulations adopted pursuant thereto. In accordance with the law and regulations, all manufacturing processes for steel and iron materials furnished for incorporation into the work on this project shall occur in the United States; with the exception that pig iron and processed, pelletized and reduced iron ore manufactured outside of the United States may be used in the domestic manufacturing process for such steel and iron materials. The application of coatings, such as epoxy coating,

galvanizing, painting and any other coating that protects or enhances the value of steel or iron materials shall be considered a manufacturing process subject to the "Buy America" requirements.

A Certificate of Compliance, conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, shall be furnished for steel and iron materials. The certificates, in addition to certifying that the materials comply with the specifications, shall also specifically certify that all manufacturing processes for the materials occurred in the United States, except for the above exceptions.

The requirements imposed by the law and regulations do not prevent a minimal use of foreign steel and iron materials if the total combined cost of the materials used does not exceed one-tenth of one percent (0.1%) of the total contract cost or \$2,500, whichever is greater. The Contractor shall furnish the Engineer acceptable documentation of the quantity and value of any foreign steel and iron prior to incorporating the materials into the work.

5-1.15 SUBCONTRACTOR AND DBE RECORDS

The Contractor shall maintain records showing the name and business address of each first-tier subcontractor. The records shall also show the name and business address of every DBE subcontractor, DBE vendor of materials and DBE trucking company, regardless of tier. The records shall show the date of payment and the total dollar figure paid to all of these firms. DBE prime contractors shall also show the date of work performed by their own forces along with the corresponding dollar value of the work.

Upon completion of the contract, a summary of these records shall be prepared on Form CEM-2402 (F) and certified correct by the Contractor or the Contractor's authorized representative, and shall be furnished to the Engineer. The form shall be furnished to the Engineer within 90 days from the date of contract acceptance. \$10,000 will be withheld from payment until the Form CEM-2402 (F) is submitted. The amount will be returned to the Contractor when a satisfactory Form CEM-2402 (F) is submitted.

Prior to the fifteenth of each month, the Contractor shall submit documentation to the Engineer showing the amount paid to DBE trucking companies listed in the Contractor's DBE information. This monthly documentation shall indicate the portion of the revenue paid to DBE trucking companies which is claimed toward DBE participation. The Contractor shall also obtain and submit documentation to the Engineer showing the amount paid by DBE trucking companies to all firms, including owner-operators, for the leasing of trucks. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement. The records must confirm that the amount of credit claimed toward DBE participation conforms with Section 2-1.02, "Disadvantaged Business Enterprise," of these special provisions.

The Contractor shall also obtain and submit documentation to the Engineer showing the truck number, owner's name, California Highway Patrol CA number, and if applicable, the DBE certification number of the owner of the truck for all trucks used during that month for which DBE participation will be claimed. This documentation shall be submitted on Form CEM-2404 (F).

5-1.152 DBE CERTIFICATION STATUS

If a DBE subcontractor is decertified during the life of the project, the decertified subcontractor shall notify the Contractor in writing with the date of decertification. If a subcontractor becomes a certified DBE during the life of the project, the subcontractor shall notify the Contractor in writing with the date of certification. The Contractor shall furnish the written documentation to the Engineer.

Upon completion of the contract, Form CEM-2403 (F) indicating the DBE's existing certification status shall be signed and certified correct by the Contractor. The certified form shall be furnished to the Engineer within 90 days from the date of contract acceptance.

5-1.155 PERFORMANCE OF DBE SUBCONTRACTORS AND SUPPLIERS

The DBEs listed by the Contractor in response to the provisions in Section 2-1.02B, "Submission of DBE Information," and Section 3, "Award and Execution of Contract," of these special provisions, which are determined by the Department to be certified DBEs, shall perform the work and supply the materials for which they are listed, unless the Contractor has received prior written authorization to perform the work with other forces or to obtain the materials from other sources.

Authorization to use other forces or sources of materials may be requested for the following reasons:

- A. The listed DBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract, when such written contract, based upon the general terms, conditions, plans and specifications for the project, or on the terms of such subcontractor's or supplier's written bid, is presented by the Contractor.
- B. The listed DBE becomes bankrupt or insolvent.
- C. The listed DBE fails or refuses to perform the subcontract or furnish the listed materials.
- D. The Contractor stipulated that a bond was a condition of executing a subcontract and the listed DBE subcontractor fails or refuses to meet the bond requirements of the Contractor.

- E. The work performed by the listed subcontractor is substantially unsatisfactory and is not in substantial conformance with the plans and specifications, or the subcontractor is substantially delaying or disrupting the progress of the work.
- F. It would be in the best interest of the State.

The Contractor shall not be entitled to any payment for such work or material unless it is performed or supplied by the listed DBE or by other forces (including those of the Contractor) pursuant to prior written authorization of the Engineer.

5-1.16 SUBCONTRACTING

Attention is directed to the provisions in Section 8-1.01, "Subcontracting," of the Standard Specifications, and Section 2, "Proposal Requirements and Conditions," and Section 3, "Award and Execution of Contract," of these special provisions.

The second sentence of the third paragraph in said Section 8-1.01 is amended to read:

When items of work in the Engineer's Estimate are preceded by the letters (S) or (S-F), said items are designated as "Specialty Items."

Section 8-1.01 of the Standard Specifications is amended by adding the following before the sixth paragraph:

Pursuant to the provisions of Section 6109 of the Public Contract Code, the Contractor shall not perform work on a public works project with a subcontractor who is ineligible to perform work on the public works project pursuant to Section 1777.1 or 1777.7 of the Labor Code.

Pursuant to the provisions of Section 1777.1 of the Labor Code, the Labor Commissioner publishes and distributes a list of contractors ineligible to perform work as a subcontractor on a public works project. This list of debarred contractors is available from the Department of Industrial Relations web site at:

<http://www.dir.ca.gov/DLSE/Debar.html>.

The provisions in the third paragraph of Section 8-1.01, "Subcontracting," of the Standard Specifications, that the Contractor shall perform with the Contractor's own organization contract work amounting to not less than 50 percent of the original contract price, is not changed by the Federal Aid requirement specified under "Required Contract Provisions Federal-Aid Construction Contracts" in Section 14 of these special provisions that the Contractor perform not less than 30 percent of the original contract work with the Contractor's own organization.

Each subcontract and any lower tier subcontract that may in turn be made shall include the "Required Contract Provisions Federal-Aid Construction Contracts" in Section 14 of these special provisions. This requirement shall be enforced as follows:

- A. Noncompliance shall be corrected. Payment for subcontracted work involved will be withheld from progress payments due, or to become due, until correction is made. Failure to comply may result in termination of the contract.

The DBE information furnished under Section 2-1.02B, "Submission of DBE Information," of these special provisions is in addition to the subcontractor information required to be furnished under Section 8-1.01, "Subcontracting," and Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications.

In conformance with the Federal DBE regulations Sections 26.53(f)(1) and 26.53(f)(2) Part 26, Title 49 CFR:

- A. The Contractor shall not terminate for convenience a DBE subcontractor listed in response to Section 2-1.02B, "Submission of DBE Information," and then perform that work with its own forces, or those of an affiliate without the written consent of the Department, and
- B. If a DBE subcontractor is terminated or fails to complete its work for any reason, the Contractor will be required to make good faith efforts to substitute another DBE subcontractor for the original DBE subcontractor, to the extent needed to meet the contract goal.

The requirement in Section 2-1.02, "Disadvantaged Business Enterprise (DBE)," of these special provisions that DBEs must be certified on the date bids are opened does not apply to DBE substitutions after award of the contract.

5-1.162 PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS

Attention is directed to the provisions in Sections 10262 and 10262.5 of the Public Contract Code and Section 7108.5 of the Business and Professions Code concerning prompt payment to subcontractors.

5-1.164 PROMPT PAYMENT OF WITHHELD FUNDS TO SUBCONTRACTORS

The Contractor shall return all moneys withheld in retention from the subcontractor within 30 days after receiving payment for work satisfactorily completed, even if the other contract work is not completed and has not been accepted in conformance with Section 7-1.17, "Acceptance of Contract," of the Standard Specifications. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the Contractor or deficient subcontract performance or noncompliance by a subcontractor.

5-1.17 PARTNERING

The State will promote the formation of a "Partnering" relationship with the Contractor in order to effectively complete the contract to the benefit of both parties. The purpose of this relationship is to maintain a cooperative communication and to mutually resolve conflicts at the lowest responsible management level.

The Contractor may request the formation of a "Partnering" relationship by submitting a request in writing to the Engineer after approval of the contract. If the Contractor's request for "Partnering" is approved by the Engineer, scheduling of a "Partnering Workshop," selecting the "Partnering" facilitator and workshop site, and other administrative details shall be as agreed to by both parties. If agreed to by the parties, additional "Partnering Workshops" will be conducted as needed throughout the life of the contract.

A one-day "Training in Partnering Concepts" session will be conducted regardless of whether the Contractor requests the formation of a "Partnering" relationship. The "Training in Partnering Concepts" session will be conducted locally for the Contractor's and the Engineer's project representatives. The Contractor shall be represented by a minimum of 2 representatives, one being the Contractor's authorized representative pursuant to Section 5-1.06, "Superintendence," of the Standard Specifications. Scheduling of the "Training in Partnering Concepts" session and selection of the trainer and training site shall be determined cooperatively by the Contractor and the Engineer. If, upon the Contractor's request, "Partnering" is approved by the Engineer, the "Training in Partnering Concepts" session shall be conducted prior to the initial "Partnering Workshop."

The costs involved in providing the "Training in Partnering Concepts" trainer and training site will be borne entirely by the State. The costs will be determined in conformance with the provisions in Section 9-1.03B, "Work Performed by Special Forces or Other Special Services," of the Standard Specifications, and paying to the Contractor the sum of that cost, except no markups will be allowed.

The costs involved in providing the "Partnering Workshop" facilitator and workshop site will be borne equally by the State and the Contractor. The division of cost will be made by determining the cost in providing the "Partnering Workshop" facilitator and workshop site in conformance with the provisions in Section 9-1.03B, "Work Performed by Special Forces or Other Special Services," of the Standard Specifications, and paying to the Contractor one-half of that cost, except no markups will be allowed.

All other costs associated with "Training in Partnering Concepts" and "Partnering Workshops" will be borne separately by the party incurring the costs, such as wages and travel expenses, and no additional compensation will be allowed therefor.

The establishment of a "Partnering" relationship will not change or modify the terms and conditions of the contract and will not relieve either party of the legal requirements of the contract.

5-1.174 VALUE ANALYSIS

The Contractor may submit to the Engineer, in writing, a request for a "Value Analysis" workshop. The purpose for having a workshop is to identify value enhancing opportunities and to consider modifications to the plans and specifications that will reduce either the total cost, time of construction or traffic congestion, without impairing, in any manner, the essential functions or characteristics of the project including, but not limited to, service life, economy of operation, ease of maintenance, benefits to the travelling public, desired appearance, or design and safety standards.

To maximize the potential benefits of a workshop, the request should be submitted to the Engineer early in the project after approval of the contract. If the Contractor's request for a "Value Analysis" workshop is approved by the Engineer, scheduling of a workshop, selecting the facilitator and workshop site, and other administrative details shall be determined cooperatively by the Contractor and the Engineer.

The workshop shall be conducted in conformance with the methodology described in the Department's "Value Analysis Team Guide" available at the Department's web site at:

<http://www.dot.ca.gov/hq/oppd/value/>

The facilitator shall be a Certified Value Specialist (CVS) as recognized by the Society of American Value Engineers (SAVE) International, which may be contacted as follows:

SAVE International, 60 Revere Drive, Northbrook, IL 60062
Telephone 1-847-480-1730, FAX 1-847-480-9282

The Contractor may submit recommendations resulting from a "Value Analysis" workshop for approval by the Engineer as cost reduction incentive proposals in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications.

The costs involved in providing the "Value Analysis" facilitator and workshop site will be borne equally by the State and the Contractor. The division of cost will be made by determining the cost in providing the "Value Analysis" facilitator and workshop site in conformance with the provisions in Section 9-1.03B, "Work Performed by Special Forces or Other Special Services," of the Standard Specifications, and paying to the Contractor one-half of that cost, except no markups will be allowed.

All other costs associated with the "Value Analysis" workshop will be borne separately by the party incurring the costs, such as wages and travel expenses, and no additional compensation will be allowed therefor.

5-1.18 DISPUTES REVIEW BOARD

To assist in the resolution of disputes or potential claims arising out of the work of this project, a Disputes Review Board, hereinafter referred to as the "DRB", shall be established by the Engineer and Contractor cooperatively upon approval of the contract. The DRB is intended to assist the contract administrative claims resolution process as set forth in the provisions of Section 9-1.04, "Notice of Potential Claim," and Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications. The DRB shall not be considered to serve as a substitute for any requirements in the specifications in regard to filing of potential claims. The requirements and procedures established in this special provision shall be considered as an essential prerequisite to filing a claim, for arbitration or for litigation prior or subsequent to project completion.

The DRB shall be utilized when dispute or potential claim resolution at the job level is unsuccessful. The DRB shall function until the day of acceptance of the contract, at which time the work of the DRB will cease except for completion of unfinished dispute hearings and reports. After acceptance of the contract any disputes or potential claims that the Contractor wants to pursue that have not been settled, shall be stated or restated, by the Contractor, in response to the Proposed Final Estimate within the time limits provided in Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications. The State will review those claims in accordance with Section 9-1.07B, of the Standard Specifications. Following the completion of the State's administrative claims procedure, the Contractor may resort to arbitration as provided in Section 9-1.10, "Arbitration," of the Standard Specifications.

Disputes, as used in this section, shall include all differences of opinion, properly noticed as provided hereinafter, between the State and Contractor on matters related to the work and other subjects considered by the State or Contractor, or by both, to be of concern to the DRB on this project, except matters relating to Contractor, subcontractor or supplier claims not actionable against the State as specified in these special provisions. Whenever the term "dispute" or "disputes" is used herein, it shall be deemed to include potential claims as well as disputes.

The DRB shall serve as an advisory body to assist in the resolution of disputes between the State and the Contractor, hereinafter referred to as the "parties". The DRB shall consider disputes referred to it, and furnish written reports containing findings and recommendations pertaining to those disputes, to the parties to aid in resolution of the differences between them. DRB findings and recommendations are not binding on the parties.

The DRB shall consist of one member selected by the State, one member selected by the Contractor, and a third member selected by the first two members and approved by both the State and the Contractor. The third member shall act as DRB Chairperson.

The first two DRB members shall select a third DRB member subject to the mutual approval of the parties, or may mutually concur on a list of potentially acceptable third DRB members and submit the list to the parties for final selection and approval of the third member. The goal in selection of the third member is to complement the professional experience of the first two members, and to provide leadership for the DRB's activities.

No DRB member shall have prior direct involvement in this contract, and no member shall have a financial interest in this contract or the parties thereto, within a period of 6 months prior to award of this contract, or during the contract, except as follows:

1. Compensation for services on this DRB.
2. Ownership interest in a party or parties, documented by the prospective DRB member, that has been reviewed and determined in writing by the State to be sufficiently insignificant to render the prospective member acceptable to the State.

3. Service as a member of other Disputes Review Boards on other contracts.
4. Retirement payments or pensions received from a party that are not tied to, dependent on or affected by the net worth of the party.
5. The above provisions apply to any party having a financial interest in this contract; including but not limited to contractors, subcontractors, suppliers, consultants, and legal and business services.

DRB members shall be especially knowledgeable in the type of construction and contract documents potentially anticipated by the contract, and shall discharge their responsibilities impartially and as an independent body considering the facts and circumstances related to the matters under consideration, applicable laws and regulations, and the pertinent provisions of the contract.

The State and the Contractor shall select their respective DRB members, in accordance with the terms and conditions of the Disputes Review Board Agreement and these provisions, within 45 days of the approval of the contract. Each party shall provide written notification to the other of the name of their selected DRB member along with the prospective member's written disclosure statement.

Before their appointments are final, the first two prospective DRB members shall submit complete disclosure statements to both the State and the Contractor. The statement shall include a resume of the prospective member's experience, together with a declaration describing all past, present and anticipated or planned future relationships, including indirect relationships through the prospective member's primary or full-time employer, to this project and with all parties involved in this construction contract; including, but not limited to, any relevant subcontractors or suppliers to the parties, the parties' principals or the parties' counsel. The DRB members shall also include a full disclosure of close professional or personal relationships with all key members of all parties to the contract. Either the Contractor or the State may object to the others nominee and that person will not be selected for the DRB. No reason need be given for the first objection. Objections to subsequent nominees must be based on a specific breach or violation of nominee responsibilities under this specification. A different person shall then be nominated within 14 Days. The third DRB member shall supply a full disclosure statement to the first two DRB members and to the parties prior to appointment. Either party may reject any of the three prospective DRB members who fail to fully comply with all required employment and financial disclosure conditions of DRB membership as described in the Disputes Review Board Agreement and elsewhere herein. A copy of the Disputes Review Board Agreement is included in this special provision.

The first duty of the State and Contractor selected members of the DRB is to select and recommend prospective third member(s) to the parties for final selection and approval. The first two DRB members shall proceed with the selection of the third DRB member immediately upon receiving written notification from the State of their selection, and shall provide their recommendation simultaneously to the parties within 21 days of the notification.

An impasse shall be considered to have been reached if the parties are unable to approve a third member within 14 days of receipt of the recommendation of the first two DRB members, or if the first two members are unable to agree upon a recommendation within the 14 day time limit allowed in the preceding paragraph. In the event of an impasse in selection of the third DRB member, the State and the Contractor shall each propose three candidates for the third position. The parties shall select all candidates proposed under this paragraph from the current list of arbitrators certified by the Public Works Contract Arbitration Committee created by Article 7.2 (commencing with Section 10245) of the State Contract Act. The first two DRB members shall then select one of the 6 proposed candidates in a blind draw.

The Contractor, the State, and all three members of the DRB shall complete and adhere to the Disputes Review Board Agreement in administration of this DRB within 14 days of the parties' concurrence in the selection of the third member. The State authorizes the Engineer to execute and administer the terms of the Agreement. The person(s) designated by the Contractor as authorized to execute Contract Change Orders shall be authorized to execute and administer the terms of this agreement, or to delegate the authority in writing. The operation of the DRB shall be in conformance with the terms of the Disputes Review Board Agreement.

The State and the Contractor shall bear the costs and expenses of the DRB equally. Each DRB board member shall be compensated at an agreed rate of \$1,000.00 per day if time spent per meeting, including all on-site time plus one hour of travel time, is greater than four hours. Each DRB board member shall be compensated at an agreed rate of \$600.00 per day if time spent per meeting, including all on-site time plus one hour of travel time, is less than or equal to four hours. The agreed rates shall be considered full compensation for on-site time, travel expenses, transportation, lodging, time for travel and incidentals for each day, or portion thereof, that the DRB member is at an authorized DRB meeting. No additional compensation will be made for time spent by DRB members in review and research activities outside the official DRB meetings unless that time, (such as time spent evaluating and preparing recommendations on specific issues presented to the DRB), has been specifically agreed to in advance by the State and Contractor. Time away from the project, that has been specifically agreed to in advance by the parties, will be compensated at an agreed rate of \$100.00 per hour. The agreed amount of \$100.00 per hour shall include all incidentals including any expenses for telephone, fax and computer services. Members serving on more than one DRB, regardless of the number of meetings per day, shall not be paid more than the all inclusive rate per day or rate per hour for an individual project. The State will provide, at no cost to the Contractor, administrative services such as conference facilities and secretarial services to the DRB. These special provisions and the

Disputes Review Board Agreement state provisions for compensation and expenses of the DRB. All DRB members shall be compensated at the same daily and hourly rate. The Contractor shall make direct payments to each DRB member for their participation in authorized meetings and approved hourly rate charges from invoices submitted by each DRB member. The State will reimburse the Contractor for its share of the costs. There will be no markups applied to any expenses connected with the DRB, either by the DRB members or by the Contractor when requesting payment of the State's share of DRB expenses.

Service of a DRB member may be terminated at any time with not less than 14 days notice as follows:

1. The State may terminate service of the State appointed member.
2. The Contractor may terminate service of the Contractor appointed member.
3. Upon the written recommendation of the State and Contractor members for the removal of the third member.
4. Upon resignation of a member.

When a member of the DRB is replaced, the replacement member shall be appointed in the same manner as the replaced member was appointed. The appointment of a replacement DRB member will begin promptly upon determination of the need for replacement and shall be completed within 14 days. Changes in either of the DRB members chosen by the two parties will not require re-selection of the third member, unless both parties agree to such re-selection in writing. The Disputes Review Board Agreement shall be amended to reflect the change of a DRB member.

The following procedure shall be used for dispute resolution:

1. If the Contractor objects to any decision, act or order of the Engineer, the Contractor shall give written notice of potential claim as specified in Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications, including provision of applicable cost documentation; or file written protests or notices pursuant to Sections 4-1.03A, "Procedure and Protest", 8-1.06, "Time of Completion", 8-1.07, "Liquidated Damages", or 8-1.10, "Utility and Non-Highway Facilities" of the Standard Specifications.
2. The Engineer will respond, in writing, to the Contractor's written protest or notice within 14 days of receipt of the written protest or notice.
3. Within 14 days after receipt of the Engineer's written response, the Contractor shall, if the Contractor still objects, file a written reply with the Engineer, stating clearly and in detail the basis of the objection.
4. Following the Contractor's objection to the Engineer's decision, the Contractor shall refer the dispute to the DRB if the Contractor wishes to further pursue the objection to the Engineer's decision. The Contractor shall make the referral in writing to the DRB, simultaneously copied to the State, within 21 days after receipt of the written reply from the Engineer. The written dispute referral shall describe the disputed matter in individual discrete segments so that it will be clear to both parties and the DRB what discrete elements of the dispute have been resolved, and which remain unresolved.
5. The Contractor, by failing to submit the written notice of referral of the matter to the DRB within 21 days after receipt of the State's written reply, waives any future claims on the matter in contention.
6. The Contractor and the State shall each be afforded an opportunity to be present and to be heard by the DRB, and to offer evidence. Either party furnishing any written evidence or documentation to the DRB must furnish copies of such information to the other party a minimum of 14 days prior to the date the DRB is scheduled to convene the hearing for the dispute. Either party shall produce such additional evidence as the DRB may deem necessary to reach an understanding and determination of the dispute. The party furnishing additional evidence shall furnish copies of such additional evidence to the other party at the same time the evidence is provided to the DRB. The DRB will not consider any evidence not furnished in accordance with the terms specified herein.
7. The DRB shall furnish a report, containing findings and recommendations as described in the Disputes Review Board Agreement, in writing to both the State and the Contractor. The DRB shall complete its reports, including minority opinion if any, and submit them to the parties within 30 days of the DRB hearing, except that time extensions may be granted at the request of the DRB with the written concurrence of both parties. The report shall include the facts and circumstances related to the matters under consideration, applicable laws and regulations, the pertinent provisions of the Contract and the actual costs and time incurred as shown on the Contractor's cost accounting records.
8. Within 30 days after receiving the DRB's report, both the State and the Contractor shall respond to the DRB in writing signifying that the dispute is either resolved or remains unresolved. Failure to provide the written response within the time specified, or a written rejection of the DRB's recommendation presented in the report by either party, shall conclusively indicate that the party(s) failing to respond accepts the DRB recommendation. Immediately after responses have been received by both parties, the DRB will provide copies of both responses to the parties simultaneously. Either party may request clarification of elements of the DRB's report from the DRB prior to responding to the report. The DRB will consider any clarification request only if submitted within 10 days of receipt of the DRB's report, and if submitted simultaneously in writing to both the DRB and the other party. Each

party may submit only one request for clarification for any individual DRB report. The DRB shall respond, in writing, to requests for clarification within 10 days of receipt of such requests.

9. The DRB's recommendations, stated in the DRB's reports, are not binding on either party. Either party may seek a reconsideration of a recommendation of the DRB. The DRB shall only grant a reconsideration based upon submission of new evidence and if the request is submitted within the 30 day time limit specified for response to the DRB's written report. Each party may submit only one request for reconsideration regarding any individual DRB recommendation.
10. If the State and the Contractor are able to resolve their dispute with the aid of the DRB's report, the State and Contractor shall promptly accept and implement the recommendations of the DRB.
11. The State or the Contractor shall not call members who served on the DRB for this contract as witnesses in arbitration proceedings which may arise from this contract, and all documents created by the DRB shall be inadmissible as evidence in subsequent arbitration proceedings, except the DRB's final written reports on each issue brought before it.
12. The State and Contractor shall jointly indemnify and hold harmless the DRB members from and against all claims, damages, losses, and expenses, including but not limited to attorney's fees, arising out of and resulting from the findings and recommendations of the DRB.
13. The DRB members shall have no claim against the State or the Contractor, or both, from any claimed harm arising out of the parties' evaluations of the DRB's report.

Disputes Involving Subcontractor Claims.—For purposes of this section, a "subcontractor claim" shall include any claim by a subcontractor (including also any pass through claims by a lower tier subcontractor or supplier) against the Contractor that is actionable by the Contractor against the Department which arises from the work, services, or materials provided or to be provided in connection with the contract. If the Contractor determines to pursue a dispute against the Department that includes a subcontractor claim, the dispute shall be processed and resolved in accordance with these special provisions and in accordance with the following:

1. The Contractor shall identify clearly in all submissions pursuant to this section, that portion of the dispute that involves a subcontractor claim or claims.
2. The Contractor shall include, as part of its submission pursuant to Step 4 above, a certification (False Claims Act Certification) by the subcontractor's or supplier's officer, partner, or authorized representative with authority to bind the subcontractor and with direct knowledge of the facts underlying the subcontractor claim. The Contractor also shall submit a certification that the subcontractor claim is acknowledged and forwarded by the Contractor. The form for these certifications are available from the Engineer.
3. At any DRB meeting on a dispute that includes one or more subcontractor claims, the Contractor shall require that each subcontractor that is involved in the dispute have present an authorized representative with actual knowledge of the facts underlying the subcontractor claim to assist in presenting the subcontractor claim and to answer questions raised by the DRB members or the Department's representatives.
4. Failure by the Contractor to declare a subcontractor claim on behalf of its subcontractor (including lower tier subcontractors' and suppliers' pass through claims) at the time of submission of the Contractor's claims, as provided hereunder, shall constitute a release of the Department by the Contractor on account of such subcontractor claim.
5. The Contractor shall include in all subcontracts under this contract that subcontractors and suppliers of any tier (a) agree to submit subcontractor claims to the Contractor in a proper form and in sufficient time to allow processing by the Contractor in accordance with the Dispute Review Board resolution specifications; (b) agree to be bound by the terms of the Dispute Review Board provisions to the extent applicable to subcontractor claims; (c) agree that, to the extent a subcontractor claim is involved, completion of all steps required under these Dispute Review Board special provisions shall be a condition precedent to pursuit by the subcontractor of any other remedies permitted by law, including without limitation of a lawsuit against the Contractor; and (d) agree that the existence of a dispute resolution process for disputes involving subcontractor claims shall not be deemed to create any claim, right, or cause of action by any subcontractor or supplier against the Department.

Notwithstanding the foregoing, this Dispute Review Board special provision shall not apply to, and the DRB shall not have the authority to consider, any subcontractor claim between the subcontractor(s) or supplier(s) and the Contractor that is not actionable by the Contractor against the Department.

A copy of the "Disputes Review Board Agreement" to be executed by the Contractor, State and the three DRB members after approval of the contract follows:

DISPUTES REVIEW BOARD AGREEMENT

(Contract Identification)

Contract No. _____

THIS DISPUTES REVIEW BOARD AGREEMENT, hereinafter called "AGREEMENT", made and entered into this _____ day of _____, _____, between the State of California, acting through the California Department of Transportation and the Director of Transportation, hereinafter called the "STATE"; _____ hereinafter called the "CONTRACTOR"; and the Disputes Review Board, hereinafter called the "DRB" consisting of the following members:

(Contractor Appointee)

(State Appointee)

and _____
(Third Person)

WITNESSETH, that

WHEREAS, the STATE and the CONTRACTOR, hereinafter called the "parties", are now engaged in the construction on the State Highway project referenced above; and

WHEREAS the special provisions for the above referenced contract provides for the establishment and operation of the DRB to assist in resolving disputes; and

WHEREAS, the DRB is composed of three members, one selected by the STATE, one selected by the CONTRACTOR, and the third member selected by the other two members and approved by the parties;

NOW THEREFORE, in consideration of the terms, conditions, covenants, and performance contained herein, or attached and incorporated and made a part hereof, the STATE, the CONTRACTOR, and the DRB members hereto agree as follows:

I DESCRIPTION OF WORK

To assist in the resolution of disputes between the parties, the contract provides for the establishment and the operation of the DRB. The intent of the DRB is to fairly and impartially consider disputes placed before it and provide written recommendations for resolution of these disputes to both parties. The members of this DRB shall perform the services necessary to participate in the DRB's actions as designated in Section II, Scope of Work.

II SCOPE OF WORK

The scope of work of the DRB includes, but is not limited to, the following:

A. Objective

The principal objective of the DRB is to assist in the timely resolution of disputes between the parties arising from performance of this contract. It is not intended for either party to default on their normal responsibility to amicably and fairly settle their differences by indiscriminately assigning them to the DRB. It is intended that the mere existence of the DRB will encourage the parties to resolve disputes without resorting to this review procedure. But when a dispute which is serious enough to warrant the DRB's review does develop, the process for prompt and efficient action will be in place.

B. Procedures

The DRB shall render written reports on disputes between the parties arising from the construction contract. Prior to consideration of a dispute, the DRB shall establish rules and regulations that will govern the conduct of its business and reporting procedures in accordance with the requirements of the contract and the terms of this AGREEMENT. DRB recommendations, resulting from its consideration of a dispute, shall be furnished in writing to both parties. The recommendations shall be based on the pertinent contract provisions, and the facts and circumstances involved in the dispute. The recommendations shall find one responsible party in a dispute; shared or "jury" determinations shall not be rendered.

The DRB shall refrain from officially giving any advice or consulting services to anyone involved in the contract. The individual members shall act in a completely independent manner and while serving as members of the DRB shall have no consulting business connections with either party or its principals or attorneys or any other affiliates (subcontractors, suppliers, etc.) who have a beneficial interest in the contract.

During scheduled meetings of the DRB as well as during dispute hearings, DRB members shall refrain from expressing opinions on the merits of statements on matters under dispute or potential dispute. Opinions of DRB members expressed in private sessions shall be kept strictly confidential. Individual DRB members shall not meet with, or discuss contract issues with individual parties, except as directed by the DRB Chairperson. Any such discussions or meetings shall be disclosed to both parties. Any other discussions regarding the project between the DRB members and the parties shall be in the presence of all three members and both parties. Individual DRB members shall not undertake independent investigations of any kind pertaining to disputes or potential disputes, except with the knowledge of both parties and as expressly directed by the DRB Chairperson.

C. Construction Site Visits, Progress Meetings and Field Inspections

The DRB members shall visit the project site and meet with representatives of the parties to keep abreast of construction activities and to develop familiarity with the work in progress. All scheduled progress meetings shall be held at or near the job site. The DRB shall meet at least once at the start of the project, and at least once every six months thereafter. The frequency, exact time, and duration of additional site visits and progress meetings shall be as recommended by the DRB and approved by the parties consistent with the construction activities or matters under consideration and dispute. Each meeting shall consist of a round table discussion and a field inspection of the work being performed on the contract, if necessary. Each meeting shall be attended by representatives of both parties. The agenda shall generally be as follows:

1. Meeting opened by the DRB Chairperson.
2. Remarks by the STATE's representative.
3. A description by the CONTRACTOR's representative of work accomplished since the last meeting; the current schedule status of the work; and a forecast for the coming period.
4. An outline by the CONTRACTOR's representative of potential problems and a description of proposed solutions.
5. An outline by the STATE's representative of the status of the work as the STATE views it.
6. A brief description by the CONTRACTOR's or STATE's representative of potential claims or disputes which have surfaced since the last meeting.
7. A summary by the STATE's representative, the CONTRACTOR's representative, or the DRB of the status of past disputes and claims.

The STATE's representative will prepare minutes of all regular meetings and circulate them for revision and approval by all concerned.

The field inspection shall cover all active segments of the work, the DRB being accompanied by both parties' representatives. The field inspection may be waived upon mutual agreement of the parties.

D. DRB Consideration and Handling of Disputes

Upon receipt by the DRB of a written referral of a dispute, the DRB shall convene to review and consider the dispute. The DRB shall determine the time and location of DRB hearings, with due consideration for the needs and preferences of the parties while recognizing the paramount importance of speedy resolution of issues. If the matter is not urgent, it may be scheduled for the time of the next scheduled DRB visit to the project. For an urgent matter, and upon the request of either party, the DRB shall meet at its earliest convenience.

Normally, hearings shall be conducted at or near the project site. However, any location which would be more convenient and still provide all required facilities and access to necessary documentation shall be satisfactory.

Both parties shall be given the opportunity to present their evidence at these hearings. It is expressly understood that the DRB members are to act impartially and independently in the consideration of the contract provisions, and the facts and

conditions surrounding any dispute presented by either party, and that the recommendations concerning any such dispute are advisory and nonbinding on the parties.

The DRB may request that written documentation and arguments from both parties be sent to each DRB member, through the DRB Chairperson, for review before the hearing begins. A party furnishing any written documentation to the DRB shall furnish copies of such information to the other party at the same time that such information is supplied to the DRB.

DRB hearings shall be informal. There shall be no testimony under oath or cross-examination. There shall be no reporting of the procedures by a shorthand reporter or by any electronic means. Documents and verbal statements shall be received by the DRB in accordance with acceptance standards established by the DRB. Said standards need not comply with prescribed legal laws of evidence.

The third DRB member shall act as Chairperson for dispute hearings and all other DRB activities. The parties shall have a representative at all hearings. Failure to attend a duly noticed meeting by either of the parties shall be conclusively considered by the DRB as indication that the non-attending party considers any written submittals as their entire and complete argument. The claimant shall discuss the dispute, followed by the other party. Each party shall then be allowed one or more rebuttals until all aspects of the dispute are thoroughly covered. DRB members may ask questions, seek clarification, or request further data from either of the parties. The DRB may request from either party documents or information that would assist the DRB in making its findings and recommendations including, but not limited to, documents used by the CONTRACTOR in preparing the bid for the project. A refusal by a party to provide information requested by the DRB may be considered by the DRB as an indication that the requested material would tend to disprove that party's position. Claims shall not necessarily be computed by merely subtracting bid price from the total cost of the affected work. However, if any claims are based on the "total cost method", then, to be considered by the DRB, they shall be supported by evidence furnished by the CONTRACTOR that (1) the nature of the dispute(s) makes it impossible or impracticable to determine cost impacts with a reasonable degree of accuracy, (2) the CONTRACTOR's bid estimate was realistic, (3) the CONTRACTOR's actual costs were reasonable, and (4) the CONTRACTOR was not responsible for the added expenses. As to any claims based on the CONTRACTOR's field or home office accounting records, those claims shall be supported by an audit report of an independent Certified Public Accountant unless the contract includes special provisions that provide for an alternative method to calculate unabsorbed home office overhead. Any of those claims shall also be subject to audit by the DRB with the concurrence of the parties. In large or complex cases, additional hearings may be necessary in order to consider all the evidence presented by both parties. All involved parties shall maintain the confidentiality of all documents and information, as provided in this AGREEMENT.

During dispute hearings, no DRB member shall express an opinion concerning the merit of any facet of the case. All DRB deliberations shall be conducted in private, with all interim individual views kept strictly confidential.

After hearings are concluded, the DRB shall meet in private and reach a conclusion supported by two or more members. Private sessions of the DRB may be held at a location other than the job site or by electronic conferencing as deemed appropriate, in order to expedite the process.

The DRB's findings and recommendations, along with discussion of reasons therefor, shall then be submitted as a written report to both parties. Recommendations shall be based on the pertinent contract provisions, applicable laws and regulations, and facts and circumstances related to the dispute. The report shall be thorough in discussing the facts considered, the contract language, law or regulation viewed by the DRB as pertinent to the issues, and the DRB's interpretation and philosophy in arriving at its conclusions and recommendations. The DRB's report shall stand on its own, without attachments or appendices. The DRB chairman shall complete and furnish a summary report to the DRB Program Manager, Construction Program, M.S. 44, P.O. Box 942874, Sacramento, CA 94274.

With prior written approval of both parties, the DRB may obtain technical services necessary to adequately review the disputes presented; including audit, geotechnical, schedule analysis and other services. The parties' technical staff may supply those services as appropriate. The cost of any technical services, as agreed to by the parties, shall be borne equally by the two parties as specified in an approved contract change order. The CONTRACTOR will not be entitled to markups for the payments made for these services.

The DRB shall resist submittal of incremental portions of information by either party, in the interest of making a fully-informed decision and recommendation.

The DRB shall make every effort to reach a unanimous decision. If this proves impossible, the dissenting member shall prepare a minority opinion, which shall be included in the DRB's report.

Although both parties should place weight upon the DRB's recommendations, they are not binding. Either party may appeal a recommendation to the DRB for reconsideration. However, reconsideration shall only be allowed when there is new evidence to present, and the DRB shall accept only one appeal from each party pertaining to any individual DRB recommendation. The DRB shall hear appeals in accordance with the terms described in the Section entitled "Disputes Review Board" in the special provisions.

E. DRB Member Replacement

Should the need arise to appoint a replacement DRB member, the replacement DRB member shall be appointed in the same manner as the original DRB members were appointed. The selection of a replacement DRB member shall begin promptly upon notification of the necessity for a replacement and shall be completed within 14 days. This AGREEMENT will be amended to indicate change in DRB membership.

III CONTRACTOR RESPONSIBILITIES

The CONTRACTOR shall furnish to each DRB member one copy of all pertinent documents which are or may become necessary for the DRB to perform their function. Pertinent documents are any drawings or sketches, calculations, procedures, schedules, estimates, or other documents which are used in the performance of the work or in justifying or substantiating the CONTRACTOR's position. The CONTRACTOR shall also furnish a copy of such pertinent documents to the STATE, in accordance with the terms outlined in the special provisions.

IV STATE RESPONSIBILITIES

The STATE will furnish the following services and items:

A. Contract Related Documents

The STATE will furnish to each DRB member one copy of Notice to Contractors and Special Provisions, Proposal and Contract, Plans, Standard Specifications, and Standard Plans, change orders, written instructions issued by the STATE to the CONTRACTOR, or other documents pertinent to any dispute that has been referred to the DRB and necessary for the DRB to perform its function.

B. Coordination and Services

The STATE, through the Engineer, will, in cooperation with the CONTRACTOR, coordinate the operations of the DRB. The Engineer will arrange or provide conference facilities at or near the project site and provide secretarial and copying services to the DRB without charge to the CONTRACTOR.

V TIME FOR BEGINNING AND COMPLETION

Once established, the DRB shall be in operation until the day of acceptance of the contract. The DRB members shall not begin any work under the terms of this AGREEMENT until authorized in writing by the STATE.

VI PAYMENT

A. All Inclusive Rate Payment

The STATE and the CONTRACTOR shall bear the costs and expenses of the DRB equally. Each DRB board member shall be compensated at an agreed rate of \$1,000.00 per day if time spent per meeting, including all on-site time plus one hour of travel time, is greater than four hours. Each DRB board member shall be compensated at an agreed rate of \$600.00 per day if time spent per meeting, including all on-site time plus one hour of travel time, is less than or equal to four hours. The agreed rates shall be considered full compensation for on-site time, travel expenses, transportation, lodging, time for travel and incidentals for each day, or portion thereof, that the DRB member is at an authorized DRB meeting. No additional compensation will be made for time spent by DRB members in review and research activities outside the official DRB meetings unless that time has been specifically agreed to in advance by the STATE and CONTRACTOR. Time away from the project, that has been specifically agreed to in advance by the parties, will be compensated at an agreed rate of \$100.00 per hour. The agreed amount of \$100.00 per hour shall include all incidentals including any expenses for telephone, fax and computer services. Members serving on more than one DRB, regardless of the number of meetings per day, shall not be paid more than the all inclusive rate per day or rate per hour for an individual project. The STATE will provide, at no cost to the CONTRACTOR, administrative services such as conference facilities and secretarial services to the DRB.

B. Payments

All DRB members shall be compensated at the same rate. The CONTRACTOR shall make direct payments to each DRB member for their participation in authorized meetings and approved hourly rate charges from invoices submitted by each DRB member. The STATE will reimburse the CONTRACTOR for its share of the costs of the DRB.

The DRB members may submit invoices to the CONTRACTOR for partial payment for work performed and services rendered for their participation in authorized meetings not more often than once per month during the progress of the work. The invoices shall be in a format approved by the parties and accompanied by a general description of activities performed during that billing period. Payment for any hourly fees, at the agreed rate, shall not be paid to a DRB member until the amount and extent of those fees are approved by the STATE and CONTRACTOR.

Invoices shall be accompanied by original supporting documents, which the CONTRACTOR shall include with the extra work billing when submitting for reimbursement of the STATE's share of cost from the STATE. The CONTRACTOR will be reimbursed for one-half of approved costs of the DRB. No markups will be added to the CONTRACTOR's payment.

C. Inspection of Costs Records

The DRB members and the CONTRACTOR shall keep available for inspection by representatives of the STATE and the United States, for a period of three years after final payment, the cost records and accounts pertaining to this AGREEMENT. If any litigation, claim, or audit arising out of, in connection with, or related to this contract is initiated before the expiration of the three-year period, the cost records and accounts shall be retained until such litigation, claim, or audit involving the records is completed.

VII ASSIGNMENT OF TASKS OF WORK

The DRB members shall not assign any of the work of this AGREEMENT.

VIII TERMINATION OF AGREEMENT, THE DRB, AND DRB MEMBERS

DRB members may resign from the DRB by providing not less than 14 days written notice of the resignation to the STATE and CONTRACTOR. DRB members may be terminated by their original appointing power, in accordance with the terms of the contract.

IX LEGAL RELATIONS

The parties hereto mutually understand and agree that the DRB member in the performance of duties on the DRB, is acting in the capacity of an independent agent and not as an employee of either party.

No party to this AGREEMENT shall bear a greater responsibility for damages or personal injury than is normally provided by Federal or State of California Law.

Notwithstanding the provisions of this contract that require the CONTRACTOR to indemnify and hold harmless the STATE, the parties shall jointly indemnify and hold harmless the DRB members from and against all claims, damages, losses, and expenses, including but not limited to attorney's fees, arising out of and resulting from the findings and recommendations of the DRB.

X CONFIDENTIALITY

The parties hereto mutually understand and agree that all documents and records provided by the parties in reference to issues brought before the DRB, which documents and records are marked "Confidential - for use by the DRB only", shall be kept in confidence and used only for the purpose of resolution of subject disputes, and for assisting in development of DRB findings and recommendations; that such documents and records will not be utilized or revealed to others, except to officials of the parties who are authorized to act on the subject disputes, for any purposes, during the life of the DRB. Upon termination of this AGREEMENT, said confidential documents and records, and all copies thereof, shall be returned to the parties who furnished them to the DRB. However, the parties understand that such documents shall be subsequently discoverable and admissible in court or arbitration proceedings unless a protective order has been obtained by the party seeking further confidentiality.

**XI
DISPUTES**

Any dispute between the parties hereto, including disputes between the DRB members and either party or both parties, arising out of the work or other terms of this AGREEMENT, which cannot be resolved by negotiation and mutual concurrence between the parties, or through the administrative process provided in the contract, shall be resolved by arbitration as provided in Section 9-1.10, "Arbitration," of the Standard Specifications.

**XII
VENUE, APPLICABLE LAW, AND PERSONAL JURISDICTION**

In the event that any party, including an individual member of the DRB, deems it necessary to institute arbitration proceedings to enforce any right or obligation under this AGREEMENT, the parties hereto agree that any such action shall be initiated in the Office of Administrative Hearings of the State of California. The parties hereto agree that all questions shall be resolved by arbitration by application of California law and that the parties to such arbitration shall have the right of appeal from such decisions to the Superior Court in accordance with the laws of the State of California. Venue for the arbitration shall be Sacramento or any other location as agreed to by the parties.

**XIII
FEDERAL REVIEW AND REQUIREMENTS**

On Federal-Aid contracts, the Federal Highway Administration shall have the right to review the work of the DRB in progress, except for any private meetings or deliberations of the DRB.

All other Federal requirements in this agreement shall only apply to Federal-Aid contracts.

**XIV
CERTIFICATION OF THE CONTRACTOR,
THE DRB MEMBERS, AND THE STATE**

IN WITNESS WHEREOF, the parties hereto have executed this AGREEMENT as of the day and year first above written.

DRB MEMBER

DRB MEMBER

By: _____

By: _____

Title: _____

Title : _____

DRB MEMBER

By : _____

Title : _____

CONTRACTOR

CALIFORNIA STATE DEPARTMENT
OF TRANSPORTATION

By: _____

By: _____

Title: _____

Title: _____

5-1.19 FORCE ACCOUNT PAYMENT

The second, third and fourth paragraphs of Section 9-1.03A, "Work Performed by Contractor," in the Standard Specifications, shall not apply.

Attention is directed to "Overhead" of these special provisions.

To the total of the direct costs for work performed on a force account basis, computed as provided in Sections 9-1.03A(1), "Labor," 9-1.03A(2), "Materials," and 9-1.03A(3), "Equipment Rental," of the Standard Specifications, there will be added the following markups:

Cost	Percent Markup
Labor	28
Materials	10
Equipment Rental	10

The above markups shall be applied to all work performed on a force account basis, regardless of whether the work revises the current contract completion date.

The above markups, together with payments made for time-related overhead pursuant to "Overhead" of these special provisions, shall constitute full compensation for all overhead costs for work performed on a force account basis. These overhead costs shall be deemed to include all items of expense not specifically designated as cost or equipment rental in conformance with the provisions in Sections 9-1.03A(1), "Labor," 9-1.03A(2), "Materials," and 9-1.03A(3), "Equipment Rental," of the Standard Specifications. The total payment made as provided above and in the first paragraph of Section 9-1.03A, "Work Performed by Contractor," of the Standard Specifications shall be deemed to be the actual cost of the work performed on a force account basis, and shall constitute full compensation therefor. Full compensation for all overhead costs for work performed on a force account basis, and for which no adjustment is made to the quantity of time-related overhead pursuant to "Overhead" of these special provisions, shall be considered as included in the markups specified above, and no additional compensation will be allowed therefor.

When extra work to be paid for on a force account basis is performed by a subcontractor, approved in conformance with the provisions in Section 8-1.01, "Subcontracting," of the Standard Specifications, an additional markup of 7 percent will be added to the total cost of that extra work including all markups specified in this section "Force Account Payment". The additional 7 percent markup shall reimburse the Contractor for additional administrative costs, and no other additional payment will be made by reason of performance of the extra work by a subcontractor.

5-1.20 CLAIMS SUBMITTAL

Claims submittal may be made on work completed, except for plant establishment work, upon receiving relief from maintenance and responsibility for the completed work in lieu of acceptance by the Director as specified in Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications. Claims submitted upon granting of relief from maintenance and responsibility will be processed in accordance with Section 9-1.07B of the Standard Specifications and these special provisions.

Upon the request of the Contractor, relief from maintenance and responsibility for work completed in accordance with the requirements of the contract and to the satisfaction of the Engineer may be granted as specified in Section 7-1.15, "Relief From Maintenance and Responsibility," of the Standard Specifications. Within 90 days of granting relief from maintenance and responsibility, the Engineer will issue to the Contractor, in writing, a progress pay estimate finalizing the completed items of work. Within 30 days after receiving the progress pay estimate, the Contractor may submit to the Engineer a written statement of the claims arising under the contract exclusive of plant establishment work. No claim arising from work which relief of maintenance and responsibility were granted will be considered that was not included in the written statement of claims.

The proposed final estimate for the contract will be submitted to the Contractor after acceptance of the work, including plant establishment. After submittal of the proposed final estimate, no claim will be considered except for those arising from plant establishment work or additional work ordered by the Engineer during the plant establishment period of the contract.

The process for resolution of the contract claims, including plant establishment work, by arbitration shall not begin until acceptance of the work by the Engineer and shall be in accordance with Section 9-1.10, "Arbitration," of the Standard Specifications.

5-1.21 COMPENSATION ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS

The provisions of this section shall apply only to the following contract item :

ITEM CODE	ITEM
390152	ASPHALT CONCRETE
390180	ASPHALT CONCRETE (BRIDGE)

The compensation payable for said asphalt concrete will be subject to being increased or decreased in accordance with the provisions of this section for paving asphalt price fluctuations exceeding 5 percent (Iu/Ib is greater than 1.05 or less than 0.95) which occur during performance of the work.

The adjustment in compensation will be determined in accordance with the following formulae when the item of asphalt concrete is included in a monthly estimate:

Total monthly adjustment = AQ

For an increase in paving asphalt price
index exceeding 5 percent

$$A = 0.90 (Iu/Ib - 1.05) Ib$$

For a decrease in paving asphalt price
index exceeding 5 percent

$$A = 0.90 (Iu/Ib - 0.95) Ib$$

Where A = Adjustment in dollars per ton of paving
asphalt used to produce asphalt
concrete rounded to the nearest
\$0.01.

Iu = The California Statewide Paving
Asphalt Price Index which is in
effect on the first business day of the
month within the pay period in
which the quantity subject to
adjustment was included in the
estimate.

Ib = The California Statewide Paving
Asphalt Price Index for the month in
which the bid opening for the project
occurred.

Q = Quantity in tons of paving asphalt that
was used in producing the quantity
of asphalt concrete shown under
"This Estimate" on the monthly
estimate using the amount of asphalt
determined by the Engineer.

The adjustment in compensation will also be subject to the following:

1. The compensation adjustments provided herein, will be shown separately on payment estimates. The Contractor shall be liable to the State for decreased compensation adjustments and the Department may deduct the amount thereof from any moneys due or that may become due the Contractor.

2. Compensation adjustments made under this section will be taken into account in making adjustments under Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

3. The total price adjustment for price index increases of paving asphalt on this project shall not exceed \$82,800.
4. In the event of an overrun of contract time, adjustment in compensation for paving asphalt included in estimates during the overrun period will be determined using the California Statewide Paving Asphalt Price Index in effect on the first business day of the month within the pay period in which the overrun began.

The California Statewide Paving Asphalt Price Index is determined each month on the first business day of the month by the Department using the median of posted prices in effect as posted by Chevron, Mobil and Unocal for the Buena Vista, Huntington Beach, Kern River, Long Beach, Midway Sunset and Wilmington fields.

In the event that any of the companies discontinue posting their prices for any field, the Department will determine an index from the remaining posted prices. The Department reserves the right to include in the index determination the posted prices of additional fields.

5-1.22 AREAS FOR CONTRACTOR'S USE

Attention is directed to the provisions in Section 7-1.19, "Rights in Land and Improvements," of the Standard Specifications and these special provisions.

The highway right of way shall be used only for purposes that are necessary to perform the required work. The Contractor shall not occupy the right of way, or allow others to occupy the right of way, for purposes which are not necessary to perform the required work.

No State-owned parcels adjacent to the right of way are available for the exclusive use of the Contractor within the contract limits. The Contractor shall secure at the Contractor's own expense, areas required for plant sites, storage of equipment or materials, or for other purposes.

No area is available within the contract limits for the exclusive use of the Contractor. However, temporary storage of equipment and materials on State property may be arranged with the Engineer, subject to the prior demands of State maintenance forces and to other contract requirements. Use of the Contractor's work areas and other State-owned property shall be at the Contractor's own risk, and the State shall not be held liable for damage to or loss of materials or equipment located within such areas.

5-1.23 PAYMENTS

Attention is directed to Section 9-1.06, "Partial Payments," and 9-1.07, "Payment After Acceptance," of the Standard Specifications and these special provisions.

For the purpose of making partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications, the amount set forth for the contract items of work hereinafter listed shall be deemed to be the maximum value of said contract item of work which will be recognized for progress payment purposes.

Clearing and Grubbing	\$ 57,800
Progress Schedule Critical Path Method	\$ 6,200
Bridge Removal (Portion) Location A	\$ 17,190
Bridge Removal (Portion) Location B	\$ 15,300
Bridge Removal (Portion) Location C	\$ 11,700
Bridge Removal (Portion) Location D	\$ 14,400
Bridge Removal (Portion) Location E	\$ 3,150
Bridge Removal (Portion) Location F	\$ 13,500
Bridge Removal (Portion) Location G	\$ 27,900
Bridge Removal (Portion) Location H	\$ 31,500
Bridge Removal (Portion) Location I	\$139,500
Bridge Removal (Portion) Location J	\$ 31,500
Bridge Removal (Portion) Location K	\$ 16,200
Bridge Removal (Portion) Location L	\$ 15,750
Bridge Removal (Portion) Location M	\$ 25,200
Bridge Removal (Portion) Location N	\$ 90,000
Temporary Support	\$ 49,500

After acceptance of the contract pursuant to Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, the amount, if any, payable for a contract item of work in excess of the maximum value for progress payment purposes hereinabove listed for the item, will be included for payment in the first estimate made after acceptance of the contract.

In determining the partial payments to be made to the Contractor, only the following listed materials will be considered for inclusion in the payment as materials furnished but not incorporated in the work:

Culvert Pipe and Appurtenances
Edge Drain Pipe
Irrigation System Components
Overside Drains and Appurtenances
Miscellaneous Iron and Steel
Fences and Gates
Metal Beam Guard Railing
Crash Cushions
Pavement Markers
Luminaires
Vehicular Signal Heads
Signal Standards
Lighting Standards
Camera Poles
Fiber Optic Cables
Splice Vaults
Single Video Transmitters
Single Video Receivers
CCTV Cameras
Structural Steel (Bridge)
Miscellaneous Metal
Prestressing Steel for Cast-In-Place Members (Sealed Packages Only)
Prestressing Anchorages and Ducts
Bar Reinforcing Steel
Joint Seals
Column Casings
Masonry Block

5-1.24 SOUND CONTROL REQUIREMENTS

Sound control shall conform to the provisions in Section 7-1.01I, "Sound Control Requirements," of the Standard Specifications and these special provisions.

The noise level from the Contractor's operations, between the hours of 9:00 p.m. and 7:00 a.m., shall not exceed 86 dbA at a distance of 50 feet. This requirement shall not relieve the Contractor from responsibility for complying with local ordinances regulating noise level.

The noise level requirement shall apply to the equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

When construction operations are required adjacent to or near residential structures, the Contractor shall minimize operations from the local street. The Contractor shall arrange construction activities in such a manner that continuing periods of noise are avoided.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

5-1.25 RELATIONS WITH CALIFORNIA DEPARTMENT OF FISH AND GAME

A portion of this project is located within the jurisdiction of the California Department of Fish and Game. An agreement regarding a stream or lake has been entered into by the Department of Transportation and the Department of Fish and Game. The Contractor shall be fully informed of the requirements of this agreement as well as rules, regulations, and conditions that may govern the Contractor's operations in these areas and shall conduct the work accordingly.

Copies of the agreement may be obtained at the Department of Transportation, Plans and Bid Documents Section, MS26, 1120 N Street, Room 200, Sacramento, California 94274, Telephone (916) 654-4490, and are available for inspection at the office of the District Director of Transportation at the Department of Transportation, 120 South Spring Street, Division of Construction, Room 244, Los Angeles, California 90012, Telephone Number (213) 897-0054.

It is unlawful for any person to substantially divert, obstruct or change the natural flow of the bed, channel or bank of a stream, river or lake without first notifying the Department of Fish and Game, unless the project or activity is noticed and constructed in conformance with conditions imposed under Fish and Game Code Section 1601.

Attention is directed to Sections 7-1.01, "Laws to be Observed," 7-1.01G, "Water Pollution," and 7-1.12, "Responsibility for Damage," of the Standard Specifications and "Legal Relations and Responsibility," of these special provisions.

Modifications to the agreement between the Department of Transportation and the Department of Fish and Game which are proposed by the Contractor shall be submitted in writing to the Engineer for transmittal to the Department of Fish and Game for their consideration.

When the Contractor is notified by the Engineer that a modification to the agreement is under consideration, no work shall be performed which is inconsistent with the original agreement or proposed modification until the Departments take action on the proposed modifications. Compensation for delay will be determined in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The provisions of this section shall be made a part of every subcontract executed pursuant to this contract.

Modifications to any agreement between the Department of Transportation and the Department of Fish and Game will be fully binding on the Contractor. The provisions of this section shall be made a part of every subcontract executed pursuant to this contract.

5-1.26 RELATIONS WITH CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

The location of the project is within an area controlled by the Regional Water Quality Control Board. Regional Water Quality Control Board Order No. 99-06-DWQ has been issued covering work to be performed under this contract. The Contractor shall be fully informed of rules, regulations and conditions that may govern the Contractor's operations in the areas and shall conduct the work accordingly.

Copies of the order may be obtained at the Department of Transportation, Plans and Bid Documents Section, MS26, 1120 N Street, Room 200, Sacramento, California 94274, Telephone (916) 654-4490, and are available for inspection at the office of the District Director of Transportation at the Department of Transportation, 120 South Spring Street, Division of Construction, Room 244, Los Angeles, California 90012, Telephone Number (213) 897-0054.

Attention is directed to Sections 7-1.11, "Preservation of Property," and 7-1.12, "Responsibility for Damage," of the Standard Specifications and "Legal Relations and Responsibility," of these special provisions.

The Contractor's attention is directed to the following conditions which are among those established by the Regional Water Quality Control Board in their Order for this project:

1. The Contractor shall not use vehicles or equipment which leak substances that may impact water quality. Staging and storage areas for vehicles and equipment shall be located outside of waters of the State.
2. The Contractor shall not conduct construction activities within waters of the State during a rainfall event. The Contractor shall maintain a 5-day clear weather forecast before conducting operations within waters of the State.
3. No activities shall involve wet excavations (i.e., no excavations shall occur below the seasonal high water table). A minimum 5-foot buffer zone shall be maintained above the existing groundwater level.

Changes in the above listed conditions proposed by the Contractor shall be submitted to the Engineer for transmittal to the Regional Water Quality Control Board for their approval. Changes shall not be implemented until approved in writing by the Regional Water Quality Control Board.

Attention is directed to Section 8-1.06, "Time of Completion," of the Standard Specifications. Days during which the Contractor's operations are restricted in the floodway by the requirements of this section shall be considered to be nonworking days if these restrictions cause a delay in the current controlling operation or operations.

5-1.27 RELATIONS WITH U.S. ARMY CORPS OF ENGINEERS

A portion of this project is located within the jurisdiction of the U.S. Army Corps of Engineers. An agreement has been entered into by the Department of Transportation and the U.S. Army Corps of Engineers. The Contractor shall be fully informed of the requirements of this agreement as well as rules, regulations, and conditions that may govern the Contractor's operations in these areas and shall conduct the work accordingly.

Copies of the agreement may be obtained at the Department of Transportation, Plans and Bid Documents Section, MS26, 1120 N Street, Room 200, Sacramento, California 94274, Telephone (916) 654-4490, and are available for inspection at the office of the District Director of Transportation at the Department of Transportation, 120 South Spring Street, Division of Construction, Room 244, Los Angeles, California 90012, Telephone Number (213) 897-0054.

It is unlawful for any person to substantially divert, obstruct or change the natural flow of the bed, channel or bank of a stream, river or lake without first notifying the U.S. Army Corps of Engineers, unless the project or activity is noticed and constructed in conformance with conditions imposed by the U.S. Army Corps of Engineers permit.

The Contractor's attention is directed to the following conditions which are among those established by the U.S. Army Corps of Engineers in their Order for this project:

At the Rio Hondo and San Gabriel River Channels, openings in the channel invert or walls shall not be permitted during the storm season (October 15 through April 15).

At the Rio Hondo and San Gabriel River Channels, the maximum weight of equipment for placing, moistening, backfilling or compacting (including vibratory dynamic forces) shall be 35,000 pounds. The Contractor shall not move or operate equipment within one foot of the existing retaining wall located on the southeasterly corner of the Rio Hondo bridge near Pier 6.

At the Rio Hondo and San Gabriel River Channels, the Contractor shall make provisions to prevent debris from falling into the channels during construction.

Attention is directed to Sections 7-1.01, "Laws to be Observed," 7-1.01G, "Water Pollution," and 7-1.12, "Responsibility for Damage," of the Standard Specifications and "Legal Relations and Responsibility," of these special provisions.

Modifications to the agreement between the Department of Transportation and the U.S. Army Corps of Engineers which are proposed by the Contractor shall be submitted in writing to the Engineer for transmittal to the U.S. Army Corps of Engineers for their consideration.

When the Contractor is notified by the Engineer that a modification to the agreement is under consideration, no work shall be performed which is inconsistent with the original agreement or proposed modification until the Department and the U.S. Army Corps of Engineers take action on the proposed modifications. Compensation for delay will be determined in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The provisions of this section shall be made a part of every subcontract executed pursuant to this contract.

Modifications to any agreement between the Department of Transportation and the U.S. Army Corps of Engineers will be fully binding on the Contractor. The provisions of this section shall be made a part of every subcontract executed pursuant to this contract.

5-1.28 RELATIONS WITH THE LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

A portion of this project is located within the jurisdiction of the Los Angeles County Flood Control District. An agreement has been entered into by the Department of Transportation and the Los Angeles County Flood Control District. The Contractor shall be fully informed of the requirements of this agreement as well as rules, regulations, and conditions that may govern the Contractor's operations in these areas and shall conduct the work accordingly.

Copies of the agreement may be obtained at the Department of Transportation, Plans and Bid Documents Section, MS26, 1120 N Street, Room 200, Sacramento, California 94274, Telephone (916) 654-4490, and are available for inspection at the office of the District Director of Transportation at the Department of Transportation, 120 South Spring Street, Division of Construction, Room 244, Los Angeles, California 90012, Telephone Number (213) 897-0054.

It is unlawful for any person to substantially divert, obstruct or change the natural flow of any flood control facility without first notifying the Los Angeles County Flood Control District, unless the project or activity is noticed and constructed in conformance with conditions imposed by the Los Angeles County Flood Control District permit.

Attention is directed to Sections 7-1.01, "Laws to be Observed," 7-1.01G, "Water Pollution," and 7-1.12, "Responsibility for Damage," of the Standard Specifications and "Legal Relations and Responsibility," of these special provisions.

Modifications to the agreement between the Department of Transportation and the Los Angeles County Flood Control District which are proposed by the Contractor shall be submitted in writing to the Engineer for transmittal to the Los Angeles County Flood Control District for their consideration.

When the Contractor is notified by the Engineer that a modification to the agreement is under consideration, no work shall be performed which is inconsistent with the original agreement or proposed modification until the Departments take action on the proposed modifications. Compensation for delay will be determined in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The provisions of this section shall be made a part of every subcontract executed pursuant to this contract.

Modifications to any agreement between the Department of Transportation and the Los Angeles County Flood Control District will be fully binding on the Contractor. The provisions of this section shall be made a part of every subcontract executed pursuant to this contract.

5-1.29 AERIALY DEPOSITED LEAD

Aerially deposited lead is present within the project limits. Aerially deposited lead is lead deposited within unpaved areas or formerly unpaved areas, primarily due to vehicle emissions.

Attention is directed to "Material Containing Aerially Deposited Lead" of these special provisions.

Portions of the Site Investigation Report are included in the "Material Information" handout. The complete report, entitled "Site Investigation Report, Interstate 10 Freeway Widening, KP 45.1/51.6, Task Order No. 07-106951-8H, prepared by Ninyo and Moore Geotechnical and Environmental Sciences Consultants," is available for inspection at the Department of Transportation, 120 South Spring Street, Division of Construction, Room 244, Los Angeles, California 90012, Telephone Number (213) 897-0054.

The Department has received from the California Department of Toxic Substances Control (DTSC) a Variance regarding the use of material containing aurally deposited lead. This project is subject to the conditions of the Variance, as amended. The Variance is available for inspection at the Department of Transportation, 120 South Spring Street, Division of Construction, Room 244, Los Angeles, California 90012, Telephone Number (213) 897-0054.

Once the Contractor has completed the placement of material containing aurally deposited lead in conformance with these special provisions and as directed by the Engineer, the Contractor shall have no responsibility for such materials in place. The Department will not consider the Contractor a generator of such contaminated materials. Further cleanup, removal or remedial actions for such materials will not be required if handled or disposed of as specified herein.

Excavation, reuse, and disposal of material with aurally deposited lead shall be in conformance with all rules and regulations including, but not limited to, those of the following agencies:

United States Department of Transportation (USDOT)
United States Environmental Protection Agency (USEPA)
California Environmental Protection Agency (Cal-EPA)
California Department of Health Services
Department of Toxic Substances Control (DTSC), Region 4
California Division of Occupational Safety and Health Administration (Cal-OSHA)
Integrated Waste Management Board
Regional Water Quality Control Board (RWQCB), Region 4
State Air Resources Control Board
South Coast Air Quality Management District (SCAQMD)

Materials containing hazardous levels of lead shall be transported and disposed of in conformance with Federal and State laws and regulations, as amended, and county and municipal ordinances and regulations, as amended. Laws and regulations that govern this work include, but are not limited to:

Health and Safety Code, Division 20, Chapter 6.5 (California Hazardous Waste Control Act)
Title 22, California Code of Regulations, Division 4.5 (Environmental Health Standards for the Management of Hazardous Waste)
Title 8, California Code of Regulations

5-1.30 DEFINITIONS AND TERMS

Delete Section 1-1.18, "Engineer," of the Standard Specifications.

Engineer

The Chief Engineer, Department of Transportation, acting either directly or through properly authorized agents, the agents acting within scope of the particular duties delegated to them.

Delete Section 1-1.25, "Laboratory," of the Standard Specifications.

Office of Structure Design

The Office of Structure Design of the Department of Transportation. When the specifications require working drawings to be submitted to the Office of Structure Design, the drawings shall be submitted to: Office of Structure Design, Documents Unit, Mail Station 9, 1801 30th Street, Sacramento, CA 95816, Telephone (916) 227-8252.

5-1.31 PROPOSAL FORMS

Delete the fourth paragraph of Section 2-1.05, "Proposal Forms," of the Standard Specifications.

All proposal forms other than for "District Opening" projects shall be obtained from the Department of Transportation, Plans and Bid Documents, Room 0200, Transportation Building, 1120 N Street, Sacramento, California 95814, or as otherwise designated in the "Notice to Contractor."

5-1.32 PROPOSAL REQUIREMENTS AND CONDITIONS

Delete Section 2-1.08, "Withdrawal of Proposals," of the Standard Specifications.

Withdrawal of Proposals

Any bid may be withdrawn at any time prior to the date and time fixed for the opening of bids only by written request for the withdrawal of the bid filed at the location at which the bid was received by the Department. The request shall be executed by the bidder or the bidder's duly authorized representative. The withdrawal of a bid does not prejudice the right of

the bidder to file a new bid. Whether or not bids are opened exactly at the time fixed for opening bids, a bid will not be received after that time, nor may any bid be withdrawn after the time fixed for opening of bids.

5-1.33 CONTROL OF WORK

Delete the first 2 paragraphs of Section 5-1.04, "Coordination and Interpretation of Plans, Standard Specifications, and Special Provisions," of the Standard Specifications.

The Standard Specifications, project plans, special provisions, contract change orders and all supplementary documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complimentary, and to describe and provide for a complete work.

Project plans shall govern over the Standard Specifications; and these special provisions shall govern over both the Standard Specifications and the plans.

5-1.34 LEGAL RELATIONS AND RESPONSIBILITY

Delete Section 7-1.01A(1), "Hours of Labor," of the Standard Specifications.

Hours of Labor

Eight hours labor constitutes a legal day's work. The Contractor or any subcontractor under the Contractor shall forfeit, as a penalty to the State of California, \$25 for each worker employed in the execution of the contract by the respective Contractor or subcontractor for each calendar day during which that worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the requirements of the Labor Code, and in particular, Section 1810 to Section 1815, thereof, inclusive, except that work performed by employees of Contractors in excess of 8 hours per day, and 40 hours during any one week, shall be permitted upon compensation for all hours worked in excess of 8 hours per day at not less than one and one-half times the basic rate of pay, as provided in Section 1815 thereof.

Delete Section 7-1.01A(2), "Prevailing Wage," of the Standard Specifications.

Prevailing Wage

The Contractor and any subcontractor under the Contractor shall comply with Labor Code Sections 1774 and 1775. Pursuant to Section 1775, the Contractor and any subcontractor under the Contractor shall forfeit to the State or political subdivision on whose behalf the contract is made or awarded a penalty of not more than fifty dollars (\$50) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates as determined by the Director of Industrial Relations for the work or craft in which the worker is employed for any public work done under the contract by the Contractor or by any subcontractor under the Contractor in violation of the requirements of the Labor Code and in particular, Labor Code Sections 1770 to 1780, inclusive. The amount of this forfeiture shall be determined by the Labor Commissioner and shall be based on consideration of the mistake, inadvertence, or neglect of the Contractor or subcontractor in failing to pay the correct rate of prevailing wages, or the previous record of the Contractor or subcontractor in meeting their respective prevailing wage obligations, or the willful failure by the Contractor or subcontractor to pay the correct rates of prevailing wages. A mistake, inadvertence, or neglect in failing to pay the correct rates of prevailing wages is not excusable if the Contractor or subcontractor had knowledge of the obligations under the Labor Code. In addition to the penalty and pursuant to Labor Code Section 1775, the difference between the prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by the Contractor or subcontractor. If a worker employed by a subcontractor on a public works project is not paid the general prevailing per diem wages by the subcontractor, the prime contractor of the project is not liable for the penalties described above unless the prime contractor had knowledge of that failure of the subcontractor to pay the specified prevailing rate of wages to those workers or unless the prime contractor fails to comply with all of the following requirements:

1. The contract executed between the contractor and the subcontractor for the performance of work on public works projects shall include a copy of the requirements in Sections 1771, 1775, 1776, 1777.5, 1813, and 1815 of the Labor Code.
2. The contractor shall monitor the payment of the specified general prevailing rate of per diem wages by the subcontractor to the employees, by periodic review of the certified payroll records of the subcontractor.
3. Upon becoming aware of the subcontractor's failure to pay the specified prevailing rate of wages to the subcontractor's workers, the contractor shall diligently take corrective action to halt or rectify the failure, including, but not limited to, retaining sufficient funds due the subcontractor for work performed on the public works project.

4. Prior to making final payment to the subcontractor for work performed on the public works project, the contractor shall obtain an affidavit signed under penalty of perjury from the subcontractor that the subcontractor had paid the specified general prevailing rate of per diem wages to the subcontractor's employees on the public works project and any amounts due pursuant to Section 1813 of the Labor Code.

Pursuant to Section 1775 of the Labor Code, the Division of Labor Standards Enforcement shall notify the Contractor on a public works project within 15 days of the receipt by the Division of Labor Standards Enforcement of a complaint of the failure of a subcontractor on that public works project to pay workers the general prevailing rate of per diem wages. If the Division of Labor Standards Enforcement determines that employees of a subcontractor were not paid the general prevailing rate of per diem wages and if the Department did not retain sufficient money under the contract to pay those employees the balance of wages owed under the general prevailing rate of per diem wages, the Contractor shall withhold an amount of moneys due the subcontractor sufficient to pay those employees the general prevailing rate of per diem wages if requested by the Division of Labor Standards Enforcement. The Contractor shall pay any money retained from and owed to a subcontractor upon receipt of notification by the Division of Labor Standards Enforcement that the wage complaint has been resolved. If notice of the resolution of the wage complaint has not been received by the Contractor within 180 days of the filing of a valid notice of completion or acceptance of the public works project, whichever occurs later, the Contractor shall pay all moneys retained from the subcontractor to the Department. These moneys shall be retained by the Department pending the final decision of an enforcement action.

Pursuant to the requirements in Section 1773 of the Labor Code, the Department has obtained the general prevailing rate of wages (which rate includes employer payments for health and welfare, pension, vacation, travel time and subsistence pay as provided for in Section 1773.8 of the Labor Code, apprenticeship or other training programs authorized by Section 3093 of the Labor Code, and similar purposes) applicable to the work to be done, for straight time, overtime, Saturday, Sunday and holiday work. The holiday wage rate listed shall be applicable to all holidays recognized in the collective bargaining agreement of the particular craft, classification or type of workmen concerned.

The general prevailing wage rates and any applicable changes to these wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated. General prevailing wage rates are also available from the California Department of Industrial Relations' Internet Web Site at: <http://www.dir.ca.gov>.

The wage rates determined by the Director of Industrial Relations for the project refer to expiration dates. Prevailing wage determinations with a single asterisk after the expiration date are in effect on the date of advertisement for bids and are good for the life of the contract. Prevailing wage determinations with double asterisks after the expiration date indicate that the wage rate to be paid for work performed after this date has been determined. If work is to extend past this date, the new rate shall be paid and incorporated in the contract. The Contractor shall contact the Department of Industrial Relations as indicated in the wage rate determinations to obtain predetermined wage changes.

Pursuant to Section 1773.2 of the Labor Code, general prevailing wage rates shall be posted by the Contractor at a prominent place at the site of the work.

Changes in general prevailing wage determinations which conform to Labor Code Section 1773.6 and Title 8 California Code of Regulations Section 16204 shall apply to the project when issued by the Director of Industrial Relations at least 10 days prior to the date of the Notice to Contractors for the project.

The State will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rate set forth in the contract. The possibility of wage increases is one of the elements to be considered by the Contractor in determining the bid, and will not under any circumstances be considered as the basis of a claim against the State on the contract.

Delete Section 7-1.01A(2)(a), "Travel and Subsistence Payments," of the Standard Specifications.

Attention is directed to the requirements in Section 1773.8 of the Labor Code. The Contractor shall make travel and subsistence payments to each workman, needed to execute the work, in conformance with the requirements in Labor Code Section 1773.8.

Delete the first and second paragraphs of Section 7-1.01A(3), "Payroll Records," of the Standard Specifications.

Attention is directed to the requirements in Labor Code Section 1776, a portion of which is quoted below. Regulations implementing Labor Code Section 1776 are located in Sections 16016 through 16019 and Sections 16207.10 through 16207.18 of Title 8, California Code of Regulations.

- "(a) Each contractor and subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:

- (1) The information contained in the payroll record is true and correct.
- (2) The employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project.

"(b) The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the contractor on the following basis:

- (1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative upon request.
- (2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the body awarding the contract, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.
- (3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through either the body awarding the contract, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the contractor, subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the contractor.

"(c) The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.

"(d) A contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested the records within 10 days after receipt of a written request.

"(e) Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated in a manner so as to prevent disclosure of an individual's name, address and social security number. The name and address of the contractor awarded the contract or the subcontractor performing the contract shall not be marked or obliterated.

"(f) The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

"(g) The contractor or subcontractor shall have 10 days in which to comply subsequent to receipt of a written notice requesting the records enumerated in subdivision (a). In the event that the contractor or subcontractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars (\$25) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of a subcontractor to comply with this section."

The penalties specified in subdivision (g) of Labor Code Section 1776 for noncompliance with the requirements in Section 1776 may be deducted from any moneys due or which may become due to the Contractor.

Delete Section 7-1.01A(5), "Apprentices," of the Standard Specifications.

Attention is directed to Sections 1777.5, 1777.6, and 1777.7 of the California Labor Code and Title 8, California Code of Regulations Section 200 et seq. To ensure compliance and complete understanding of the law regarding apprentices, and specifically the required ratio thereunder, each contractor or subcontractor should, where some question exists, contact the Division of Apprenticeship Standards, 455 Golden Gate Avenue, San Francisco, CA 94102, or one of its branch offices prior to commencement of work on the public works contract. Responsibility for compliance with this section lies with the Contractor.

It is State policy to encourage the employment and training of apprentices on public works contracts as may be permitted under local apprenticeship standards.

The title of Section 7-1.02, "Weight Limitations," of the Standard Specifications is amended to, "Load Limitations."

Delete the first paragraph of Section 7-1.02, "Weight Limitations."

Unless expressly permitted in the special provisions, construction equipment or vehicles of any kind which, laden or unladen, exceed the maximum weight limitations set forth in Division 15 of the Vehicle Code, shall not be operated over completed or existing treated bases, surfacing, pavement or structures in any areas within the limits of the project, whether or not the area is subject to weight limitations under Section 7-1.01D, "Vehicle Code," except as hereinafter provided in this Section 7-1.02.

Delete the second paragraph of Section 7-1.09, "Public Safety," of the Standard Specifications.

Attention is directed to "Indemnification and Insurance," of these special provisions.

Delete the first paragraph of Section 7-1.11, "Preservation of Property," of the Standard Specifications.

Attention is directed to Section 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications and "Indemnification and Insurance," of these special provisions. Due care shall be exercised to avoid injury to existing highway improvements or facilities, utility facilities, adjacent property, and roadside trees, shrubs, and other plants that are not to be removed.

The title of Section 7-1.165, is changed to read "Damage by Storm, Flood, Tsunami, or Earthquake." Any references to tidal wave or tidal waves in the Standard Specifications shall be understood to refer to tsunami or tsunamis, respectively.

5-1.35 PROSECUTION AND PROGRESS

Subcontracting

Pursuant to the provisions of Section 6109 of the Public Contract Code, the Contractor shall not perform work on a public works project with a subcontractor who is ineligible to perform work on the public works project pursuant to Section 1777.1 or 1777.7 of the Labor Code.

Delete the third paragraph of Section 8-1.01, "Subcontracting," of the Standard Specifications.

The Contractor shall perform, with the Contractor's own organization, contract work amounting to not less than 50 percent of the original total contract price, except that any designated "Specialty Items" may be performed by subcontract and the amount of any designated "Specialty Items" performed by subcontract may be deducted from the original total contract price before computing the amount of work required to be performed by the Contractor with the Contractor's own organization. When items of work in the Engineer's Estimate are preceded by the letters (S) or (S-F), those items are designated as "Specialty Items." Where an entire item is subcontracted, the value of work subcontracted will be based on the contract item bid price. When a portion of an item is subcontracted, the value of work subcontracted will be based on the estimated percentage of the contract item bid price, determined from information submitted by the Contractor, subject to approval by the Engineer.

Delete the third paragraph of Section 8-1.07, "Liquidated Damages," of the Standard Specifications.

The Contractor will be granted an extension of time and will not be assessed with liquidated damages or the cost of engineering and inspection for any portion of the delay in completion of the work beyond the time named in the special provisions for the completion of the work caused by acts of God or of the public enemy, fire, floods, tsunamis, earthquakes, epidemics, quarantine restrictions, strikes, labor disputes, shortage of materials and freight embargoes, provided that the Contractor shall notify the Engineer in writing of the causes of delay within 15 days from the beginning of that delay. The Engineer shall ascertain the facts and the extent of the delay, and the Engineer's findings thereon shall be final and conclusive.

Delete the first paragraph of Section 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications.

Attention is directed to Section 7-1.11, "Preservation of Property," of the Standard Specifications and "Indemnification and Insurance," of these special provisions. The Contractor shall protect from damage utility and other non-highway facilities that are to remain in place, be installed, relocated or otherwise rearranged.

5-1.36 MEASUREMENT AND PAYMENT

Measurement of Quantities

Elements of the material plant controller which affect the accuracy or delivery of data shall be made available for the application of security seals. These devices will be inspected and adjusting elements sealed prior to the first production of materials for the contract. The security seals will be furnished by the Engineer. Material production shall cease when alteration, disconnection or otherwise manipulation of the security seals occur, and production shall not resume until the device is inspected and resealed by the Engineer.

Delete sub-section 4 of the first paragraph of Section 9-1.03A(3b), "Equipment not on the Work," of the Standard Specifications.

SECTION 6. (BLANK)

SECTION 7. (BLANK)

SECTION 8. MATERIALS

SECTION 8-1. MISCELLANEOUS

8-1.01 PREQUALIFIED AND TESTED SIGNING AND DELINEATION MATERIALS

The Department maintains the following list of Prequalified and Tested Signing and Delineation Materials. The Engineer shall not be precluded from sampling and testing products on the List of Prequalified and Tested Signing and Delineation Materials.

The manufacturer of products on the list of Prequalified and Tested Signing and Delineation Materials shall furnish the Engineer a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each type of traffic product supplied.

For those categories of materials included in the list of Prequalified and Tested Signing and Delineation Materials, only those products shown within the listing may be used in the work. Other categories of products, not included in the list of Prequalified and Tested Signing and Delineation Materials, may be used in the work provided they conform to the requirements of the Standard Specifications.

Materials and products may be added to the list of Prequalified and Tested Signing and Delineation Materials if the manufacturer submits a New Product Information form to the New Product Coordinator at the Transportation Laboratory. Upon a Departmental request for samples, sufficient samples shall be submitted to permit performance of required tests. Approval of materials or products will be dependent upon compliance with the specifications and tests the Department may elect to perform.

PAVEMENT MARKERS, PERMANENT TYPE

RETROREFLECTIVE

Apex, Model 921 (4"x4")
Ray-O-Lite, Models SS (4"x4"), RS (4"x4") and AA (4"x4")
Stimsonite, Models 88 (4" x4"), 911 (4"x4"), 953 (2.75"x4.5")
3M Series 290 (3.5"x4")

RETROREFLECTIVE WITH ABRASION RESISTANT SURFACE (ARS)

Ray-O-Lite "AA" ARS (4"x4")
Stimsonite, Models 911 (4"x4"), 953 (2.75"x4.5")
3M Series 290 (3.5"x4")

RETROREFLECTIVE WITH ABRASION RESISTANT SURFACE (ARS)

(Used for recessed applications)

Stimsonite, Model 948 (2.3"x4.7")
Ray-O-Lite, Model 2002 (2.2"x4.7")
Stimsonite, Model 944SB (2"x4")*
Ray-O-Lite, Model 2004 ARS (2"x4")*

* For use only in 4.5-inch wide (older) recessed slots

NON-REFLECTIVE FOR USE WITH EPOXY ADHESIVE, 4" Round

Apex Universal (Ceramic)
Highway Ceramics, Inc. (Ceramic)

NON-REFLECTIVE FOR USE WITH BITUMEN ADHESIVE, 4" Round

Alpine Products, "D-Dot" and "ANR" (ABS)
Apex Universal (Ceramic)
Apex Universal, Model 929 (ABS)
Elgin Molded Plastics, "Empco-Lite" Model 900 (ABS)
Highway Ceramics, Inc. (Ceramic)
Hi-Way Safety, Inc., Models P20-2000W and 2001Y (ABS)
Interstate Sales, "Diamond Back" (ABS) and (Polypropylene)
Road Creations, Model RCB4NR (Acrylic)
Zumar Industries, "Titan TM 40A" (ABS)

PAVEMENT MARKERS, TEMPORARY TYPE

TEMPORARY MARKERS FOR LONG TERM DAY/NIGHT USE (6 months or less)

Apex Universal, Model 924 (4"x4")
Davidson Plastics, Model 3.0 (4"x4")
Elgin Molded Plastics, "Empco-Lite" Model 901 (4"x4")
Road Creations, Model R41C (4"x4")
Vega Molded Products "Temporary Road Marker" (3"x4")

TEMPORARY MARKERS FOR SHORT TERM DAY/NIGHT USE (14 days or less) (For seal coat or chip seal applications, clear protective covers are required)

Apex Universal, Model 932
Davidson Plastics, Models T.O.M., T.R.P.M. and "HH" (High Heat)
Hi-Way Safety, Inc., Model 1280/1281

STRIPING AND PAVEMENT MARKING MATERIALS

PERMANENT TRAFFIC STRIPING AND PAVEMENT MARKING TAPE

Advanced Traffic Marking, Series 300 and 400
Brite-Line, Series 1000
Brite-Line "DeltaLine XRP"
Swarco Industries, "Director 35" (For transverse application only)
Swarco Industries, "Director 60"
3M, "Stamark" Series 380 and 5730
3M, "Stamark" Series A420 (For transverse application only)

TEMPORARY (REMOVABLE) STRIPING AND PAVEMENT MARKING TAPE (6 months or less)

Advanced Traffic Marking, ATM Series 200
Brite-Line, Series 100
P.B. Laminations, Aztec, Grade 102
Swarco Industries, "Director-2"
3M, "Stamark" Series A6203M Series A145 Removable Black Line Mask
(Black Tape: For use only on Asphalt Concrete Surfaces)
Advanced Traffic Marking Black "Hide-A-Line"
(Black Tape: For use only on Asphalt Concrete Surfaces)
Brite-Line "BTR" Black Removable Tape
(Black Tape: For use only on Asphalt Concrete Surfaces)

PREFORMED THERMOPLASTIC (Heated in place)

Flint Trading, "Premark" and "Premark 20/20 Flex"
Pavemark, "Hotape"

REMOVABLE TRAFFIC PAINT

Belpro, Series 250/252 and No. 93 Remover

CERAMIC SURFACING LAMINATE, 6" X 6"

Safeline Industries/Highway Ceramics, Inc.

CLASS 1 DELINEATORS

ONE PIECE DRIVABLE FLEXIBLE TYPE, 66"

Carsonite, Curve-Flex CFRM-400
Carsonite, Roadmarker CRM-375
Davidson Plastics, "Flexi-Guide Models 400 and 566"
FlexStake, Model 654TM
GreenLine Model HWD1-66 and CGD1-66
J. Miller Industries, Model JMI-375 (with soil anchor)

SPECIAL USE FLEXIBLE TYPE, 66"

Carsonite, "Survivor" with 18" U-Channel anchor
FlexStake, Model 604
GreenLine Models HWD and CGD (with 18" U-Channel base)
Safe-Hit with 8" pavement anchor (SH248-GP1)
Safe-Hit with 15" soil anchor (SH248-GP2) and with 18" soil anchor (SH248-GP3)

SURFACE MOUNT FLEXIBLE TYPE, 48"

Bent Manufacturing Co., "Masterflex" Model MF-180EX-48"
Carsonite, "Super Duck II"
FlexStake, Surface Mount, Models 704 and 754TM

CHANNELIZERS

SURFACE MOUNT TYPE, 36"

Bent Manufacturing Co., "Masterflex" Models MF-360-36(Round) and MF-180-36(Flat)
Carsonite, "Super Duck" (Flat SDF-436, Round SDR-336)
Carsonite, Super Duck II Model SDCF203601MB "The Channelizer"
Davidson Plastics, Flex-Guide Models FG300LD and FG300UR
FlexStake, Surface Mount, Models 703 and 753TM
GreenLine, Model SMD-36
Hi-Way Safety, Inc. "Channel Guide Channelizer" Model CGC36
The Line Connection, "Dura-Post" Model DP36-3 (Permanent)
The Line Connection, "Dura-Post" Model DP36-3C (Temporary)
Repo, Models 300 and 400
Safe-Hit, Guide Post, Model SH236SMA

CONICAL DELINEATORS, 42"

(For 28" Traffic Cones, see Standard Specifications)
Bent Manufacturing Company "T-Top"
Plastic Safety Systems "Navigator-42"
Roadmaker Company "Stacker"
Traffix Devices "Grabber"

OBJECT MARKERS

TYPE "K", 18"

Carsonite, Model SMD-615
FlexStake, Model 701KM
Repo, Models 300 and 400
Safe-Hit, Model SH718SMA
The Line Connection, Model DP21-4K

TYPE "K-4" /"Q" Object Markers, 24"

Bent Manufacturing "Masterflex" Model MF-360-24
Carsonite, Super Duck II
FlexStake, Model 701KM
Repo, Models 300 and 400
Safe-Hit, Models SH8 24SMA_WA and SH 824GP3_WA
The Line Connection, Model DP21-4Q

TEMPORARY RAILING (TYPE K) REFLECTORS AND CONCRETE BARRIER MARKERS

IMPACTABLE TYPE

ARTUK, JD Series
Davidson Plastics, Model PCBM-12
Duraflex Corp., "Flexx 2020" and "Electriflexx"
Hi-Way Safety, Inc. Model GMKRM 100

NON-IMPACTABLE TYPE

ARTUK, JD Series
Stimsonite, Model 967 (with 3 1/4" Acrylic cube corner reflector)
Stimsonite, Model 967LS
Vega Molded Products, Models GBM and JD

THREE BEAM BARRIER MARKERS (For use to the left of traffic)

Duraflex Corp., "Railrider"
Davidson Plastics, "Mini" (3"x10")

CONCRETE BARRIER DELINEATORS, 16"

(For use to the right of traffic. When mounted on top of barrier, places top of reflective element at 48")

Davidson Plastics, Model PCBM T-16
Safe-Hit, Model SH216RBM
Sun-Lab Technology, "Safety Guide Light, Model TM," 5" x 5" x 3"

CONCRETE BARRIER-MOUNTED MINI-DRUM (10"x14"x22")

Stinson Equipment Company "SaddleMarker"

SOUND WALL DELINEATOR

(Applied vertically. place top of 3" x 12" reflective element at 48" above roadway)

Davidson Plastics, PCBM S-36
Sun-Lab Technology, "Safety Guide Light, Model SM12," 5" x 5" x 3"

GUARD RAILING DELINEATOR

(Top of reflective element at 48" above plane of roadway)

WOOD POST TYPE, 27"

Carsonite, Model 427
Davidson Plastics FG 427 and FG 527
FlexStake, Model 102 GR
GreenLine GRD 27
J. Miller Model JMI-375G
Safe-Hit, Model SH227GRD

STEEL POST TYPE

Carsonite, Model CFGR-327 with CFGRBK300 Mounting Bracket

RETROREFLECTIVE SHEETING

CHANNELIZERS, BARRIER MARKERS AND DELINEATORS

3M, High Intensity
Reflexite, PC-1000 Metalized Polycarbonate
Reflexite, AC-1000 Acrylic
Reflexite, AP-1000 Metalized Polyester
Reflexite, AR-1000 Abrasion Resistant Coating
Avery Dennison T-6500 Series (Formerly Stimsonite, Series 6200) (For rigid substrate devices only)

TRAFFIC CONES, 13" Sleeves

Reflexite SB (Polyester), Vinyl or "TR" (Semi-transparent)

TRAFFIC CONES, 4" and 6" Sleeves

3M Series 3840
Reflexite Vinyl or "TR" (Semi-transparent) or "Conformalite"

BARRELS AND DRUMS

Reflexite, "Super High Intensity" or "High Impact Drum Sheeting"
3M Series 3810

BARRICADES, Type I, Engineer Grade

American Decal, Adcolite
Avery Dennison, 1500 and 1600
3M, Scotchlite, Series CW

BARRICADES, Type II, Super Engineer Grade

Avery Dennison, "Fasign" 2500 Series
Kiwalite, Type II
Nikkalite 1800 Series

SIGNS, Type II, Super Engineer Grade

Avery Dennison, "Fasign" 2500 Series
Kiwalite, Type II
Nikkalite 1800 Series

SIGNS, Type III, High-Intensity Grade

3M, Series 3800

Nippon Carbide, Nikkalite Brand Ultralite Grade II

SIGNS, Type IV, High-Intensity Prismatic Grade

Avery Dennison T-6500 (Formerly Stimsonite Series 6200)

SIGNS, Type VII, High-Intensity Prismatic Grade

3M Series 3900

SIGNS, Type VI Roll-Up Signs

Reflexite, Vinyl (Orange),

Reflexite "SuperBright" (Fluorescent orange)

Reflexite "Marathon" (Fluorescent orange)

3M Series RS34 (Orange) and RS20 (Fluorescent orange)

SPECIALTY SIGN (All Plastic)

All Sign Products, STOP Sign, 30"

SIGN SUBSTRATE FOR CONSTRUCTION AREA SIGNS

ALUMINUM

FIBERGLASS REINFORCED PLASTIC (FRP)

Sequentia, "Polyplate"

Fiber-Brite

8-1.02 STATE-FURNISHED MATERIALS

Attention is directed to Section 6-1.02, "State-Furnished Materials," of the Standard Specifications and these special provisions.

The following materials will be furnished to the Contractor:

Sign panels for roadside signs and overhead sign structures.

Sign overlay panels for roadside signs and overhead sign structures.

Hardware for mounting sign panels as follows:

1. Blind rivets for mounting overlapping legend at sign panel joints.
2. Closure inserts.
3. Aluminum bolts and nuts and steel beveled washers for mounting laminated sign panels on overhead sign structures.
4. Aluminum bolts, nuts, and washers for mounting overhead formed panels.

Target plates for median mileage panels.

Padlocks for backflow preventer assembly enclosures, walk gates, and irrigation controller enclosure cabinets.

Lamps for vehicular ramp metering signal units, Type A pedestrian signal units and sign illumination equipment fixtures.

Self-adhesive reflective numbers and edge sealer for numbering electrical equipment.

Changeable message sign wiring harness No. 4 and 5 (4P18 and 24P18) and listing of field conductor terminations.

Loop detector sensor units.

Model 170 controller assemblies, including controller unit, completely wired controller cabinet, and inductive loop detector sensor units.

Completely wired Model 170, Type 334 controller cabinets, with auxiliary equipment but without controller unit and loop detector sensor units for ramp metering, census and traffic monitoring stations systems. Changeable message sign wiring harness No. 4 and 5 (4P18 and 24P18), listing of field conductor terminations and self-adhesive reflective numbers and edge sealer for numbering electrical equipment will be furnished to the Contractor at the following address:

Department of Transportation
District Maintenance Yard
7310 East Bandini Boulevard
Commerce, California 90040.

The Contractor shall notify the Engineer not less than 48 hours before State-furnished material is to be picked up by the Contractor. A full description of the material and the time the material will be picked up shall be provided.

8-1.03 SLAG AGGREGATE

Aggregate produced from slag resulting from any steel-making process or from air-cooled iron blast furnace slag shall not be used on this project.

8-1.04 MISCELLANEOUS METAL

The table in the tenth paragraph of Section 75-1.02, "Miscellaneous Iron and Steel," of the Standard Specifications is amended to read:

Material	Specification
Steel bars, plates and shapes	ASTM Designation: A 36/A 36M or A 575, A 576 (AISI or M Grades 1016 through 1030 except Grade 1017)
Steel fastener components for general applications:	
Bolts and studs	ASTM Designation: A 307
Headed anchor bolts	ASTM Designation: A 307, Grade B, including S1 supplementary requirements
Nonheaded anchor bolts	ASTM Designation: A 307, Grade C, including S1 supplementary requirements and S1.6 of AASHTO Designation: M 314 supplementary requirements or AASHTO Designation: M 314, Grade 36 or 55, including S1 supplementary requirements
High-strength bolts and studs, threaded rods, and nonheaded anchor bolts	ASTM Designation: A 449, Type 1
Nuts	ASTM Designation: A 563, including Appendix X1*
Washers	ASTM Designation: F 844
Components of high-strength steel fastener assemblies for use in structural steel joints:	
Bolts	ASTM Designation: A 325, Type 1
Tension control bolts	ASTM Designation: F 1852, Type 1
Nuts	ASTM Designation: A 563, including Appendix X1*
Hardened washers	ASTM Designation: F 436, Type 1, Circular, including S1 supplementary requirements
Direct tension indicators	ASTM Designation: F 959, Type 325, zinc-coated
Stainless steel fasteners (Alloys 304 & 316) for general applications:	
Bolts, screws, studs, threaded rods, and nonheaded anchor bolts	ASTM Designation: F 593 or F 738M
Nuts	ASTM Designation: F 594 or F 836M
Washers	ASTM Designation: A 240/A 240M and ANSI B 18.22M
Carbon-steel castings	ASTM Designation: A 27/A 27M, Grade 65-35 [450-240], Class 1
Malleable iron castings	ASTM Designation: A 47, Grade 32510 or A 47M, Grade 22010
Gray iron castings	ASTM Designation: A 48, Class 30B
Ductile iron castings	ASTM Designation: A 536, Grade 65-45-12
Cast iron pipe	Commercial quality
Steel pipe	Commercial quality, welded or extruded
Other parts for general applications	Commercial quality

* Zinc-coated nuts that will be tightened beyond snug or wrench tight shall be furnished with a dyed dry lubricant conforming to Supplementary Requirement S2 in ASTM Designation: A 563.

The table in the eighteenth paragraph of Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended to read:

Stud Diameter (inches)	Sustained Tension Test Load (kip)
1.142-1.299	31.00
0.906-1.141	17.89
0.827-0.905	14.41
* 0.709-0.826	4.99
0.591-0.708	4.09
0.473-0.590	3.19
0.355-0.472	2.10
0.236-0.354	0.95

* Maximum stud diameter permitted for mechanical expansion anchors.

The table in the nineteenth paragraph of Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended to read:

Stud Diameter (inches)	Ultimate Tensile Load (kip)
1.181-1.299	25.20
1.063-1.180	19.81
0.906-1.062	16.01
0.788-0.905	11.60
0.630-0.787	7.19
0.552-0.629	6.61
0.472-0.551	4.20

The table in the twenty-second paragraph of Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended to read:

Installation Torque Values, (lbf ft)			
Stud Diameter (millimeters)	Shell Type Mechanical Expansion Anchors	Integral Stud Type Mechanical Expansion Anchors	Resin Capsule Anchors and Cast-in-Place Inserts
1.1	—	—	398.28
0.9	—	—	232.33
0.8	—	—	173.33
0.7	81.13	173.33	147.51
0.5	33.19	88.51	73.76
0.4	22.13	47.94	29.50
0.3	11.06	25.81	17.70
0.2	3.69	7.38	—

8-1.05 ENGINEERING FABRICS

Engineering fabrics shall conform to the requirements in Section 88, "Engineering Fabrics," of the Standard Specifications and these special provisions.

Delete the fourth paragraph of Section 88-1.04, "Rock Slope Protection Fabric," of the Standard Specifications.

Woven filament type rock slope protection fabric shall be Type A or Type B as specified in these special provisions. The woven filament fabric shall be manufactured from individually extruded and quenched filaments, not from larger previously quenched fibers or films, and shall conform to the following:

Specification	Requirement	
	Type A	Type B
Weight, ounces per square yard, min. ASTM Designation: D 3776	4.0	6.0
Grab tensile strength (1-inch grip), pounds, min. in each direction ASTM Designation: D 4632	100	200
Elongation at break, percent max. ASTM Designation: D 4632	35	35
Toughness, pounds, min. (Percent elongation x grab tensile strength)	3,500	7,000
Permittivity, 1/sec., min. ASTM Designation: D 4491	0.5	0.5

Delete the sixth paragraph of Section 88-1.04, "Rock Slope Protection Fabric," of the Standard Specifications.

Nonwoven type rock slope protection fabric shall be Type A or Type B as specified in these special provisions and shall conform to the following:

Specification	Requirement	
	Type A	Type B
Weight, ounces per square yard, min. ASTM Designation: D 3776	4.0	6.0
Grab tensile strength (1-inch grip), pounds, min. in each direction ASTM Designation: D 4632	90	200
Elongation at break, percent max. ASTM Designation: D 4632	50	50
Toughness, pounds, min. (Percent elongation x grab tensile strength)	6,000	12,000
Permittivity, 1/sec., min. ASTM Designation: D 4491	0.5	0.5

Filter fabric for this project shall be ultraviolet ray (UV) protected.

8-1.06 PAINT.

Delete the last sentence of the second paragraph of Section, 91-1.01, "Description," of the Standard Specifications.

The paint shall possess satisfactory properties, in all respects which affect its application, adhesion and curing and shall be formulated to retain these properties for a minimum of one year.

The following paragraph is added to the end of Section 91-1.01, "Description," of the Standard Specifications:

The Engineer may require additional testing of any paint that has not been used within one year of manufacture.

Delete the third and fourth paragraphs of Section 91-1.03, "Manufacturing and Packaging," of the Standard Specifications.

No paint shall be used until approved by the Engineer.

All containers of paint shall be labeled showing the exact title of the paint specification, State specification number, manufacturer's product number, manufacturer's name, date of manufacture, State lot number and manufacturer's batch number.

Delete the second paragraph of Section 91-1.04, "Materials," of the Standard Specifications.

For paints designated by State Specification number, copies of the State Specifications may be obtained from the Transportation Laboratory.

Section 91-2, "Paints for Metal," of the Standard Specifications is amended to read:

91-2 PAINTS FOR METAL

91-2.01 Description

Paints for metal shall be as specified in the special provisions.

91-2.02 through 91 -2.07 (Blank)

8-1.07 LIQUID ASPHALTS

Liquid asphalts shall conform to the provisions in Section 93, "Liquid Asphalts," of the Standard Specifications and these special provisions.

Delete the first paragraph of Section 93-1.03, "Mixing and Applying," of the Standard Specifications.

Attention is directed to Section 7-1.11, "Preservation of Property," of the Standard Specifications and "Indemnification and Insurance," of these special provisions. Liquid asphalt shall be prevented from spraying upon adjacent pavements, that portion of the traveled way being used by traffic, structures, railings and barriers, markers, trees and shrubbery that are not to be removed, adjacent property and improvements, and other highway improvements or facilities not mentioned herein.

8-1.08 EPOXY

Epoxy shall conform to the provisions in Section 95, "Epoxy," of the Standard Specifications and these special provisions.

Add the following paragraph to Section 95-1.02, "Sampling and Testing," of the Standard Specifications:

Epoxy components shall be formulated to maintain the specified properties for a minimum of one year. The Engineer may require additional testing of any epoxy component that has not been used within one year of manufacture.

The title of Section 95-2.01, "Binder (Adhesive), Epoxy Resin Base (State Specification 8040-01F-03)", of the Standard Specifications is amended to read:

95-2.01 BINDER (ADHESIVE), EPOXY RESIN BASE (STATE SPECIFICATION 8040-03)

The title of Section 95-2.04, "Rapid Set Epoxy Adhesive for Pavement Markers (State Specifications 8040-51B-07)," of the Standard Specifications is amended to read:

95-2.04 RAPID SET EPOXY ADHESIVE FOR PAVEMENT MARKERS (STATE SPECIFICATION 8040-07)

The Title of Section 95-2.05, "Standard Set Epoxy Adhesive for Pavement Markers (State Specification 8040-51B-09)," of the Standard Specifications is amended to read:

95-2.05 STANDARD SET EPOXY ADHESIVE FOR PAVEMENT MARKERS (STATE SPECIFICATION 8040-09)

The Title of Section 95-2.09, "Epoxy Sealant for Inductive Loops (State Specification 8040-31D-06)," of the Standard Specifications is amended to read:

95-2.09 EPOXY SEALANT FOR INDUCTIVE LOOPS (STATE SPECIFICATION 8040-06)

SECTION 8-2. CONCRETE

8-2.01 PORTLAND CEMENT CONCRETE

Portland cement concrete shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

References to Section 90-2.01, "Portland Cement," of the Standard Specifications shall mean Section 90-2.01, "Cement," of the Standard Specifications.

Mineral admixture shall be combined with cement in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures," of the Standard Specifications for the concrete materials specified in Section 56-2, "Roadside Signs," of the Standard Specifications.

The requirements of Section 90-4.08, "Required Use of Mineral Admixture," of the Standard Specifications shall not apply to Section 19-3.025C, "Soil Cement Bedding," of the Standard Specifications.

The Department maintains a list of sources of fine and coarse aggregate that have been approved for use with a reduced amount of mineral admixture in the total amount of cementitious material to be used. A source of aggregate will be

considered for addition to the approved list if the producer of the aggregate submits to the Transportation Laboratory certified test results from a qualified testing laboratory that verify the aggregate complies with the requirements. Prior to starting the testing, the aggregate test shall be registered with the Department. A registration number can be obtained by calling (916) 227-7228. The registration number shall be used as the identification for the aggregate sample in correspondence with the Department. Upon request, a split of the tested sample shall be provided to the Department. Approval of aggregate will depend upon compliance with the specifications, based on the certified test results submitted, together with any replicate testing the Department may elect to perform. Approval will expire 3 years from the date the most recent registered and evaluated sample was collected from the aggregate source.

Qualified testing laboratories shall conform to the following requirements:

- A. Laboratories performing ASTM Designation: C 1293 shall participate in the Cement and Concrete Reference Laboratory (CCRL) Concrete Proficiency Sample Program and shall have received a score of 3 or better on all tests of the previous 2 sets of concrete samples.
- B. Laboratories performing ASTM Designation: C 1260 shall participate in the Cement and Concrete Reference Laboratory (CCRL) Pozzolan Proficiency Sample Program and shall have received a score of 3 or better on the shrinkage and soundness tests of the previous 2 sets of pozzolan samples.

Aggregates on the list shall conform to one of the following requirements:

- A. When the aggregate is tested in conformance with the requirements in California Test 554 and ASTM Designation: C 1293, the average expansion at one year shall be less than or equal to 0.040 percent; or
- B. When the aggregate is tested in conformance with the requirements in California Test 554 and ASTM Designation: C 1260, the average of the expansion at 16 days shall be less than or equal to 0.15 percent.

The amounts of cement and mineral admixture used in cementitious material shall be sufficient to satisfy the minimum cementitious material content requirements specified in Section 90-1.01, "Description," or Section 90-4.05, "Optional Use of Chemical Admixtures," of the Standard Specifications and shall conform to the following:

- A. The minimum amount of cement shall not be less than 75 percent by mass of the specified minimum cementitious material content.
- B. The minimum amount of mineral admixture to be combined with cement shall be determined using one of the following criteria:
 - 1. When the calcium oxide content of a mineral admixture is equal to or less than 2 percent by mass, the amount of mineral admixture shall not be less than 15 percent by mass of the total amount of cementitious material to be used in the mix.
 - 2. When the calcium oxide content of a mineral admixture is greater than 2 percent by mass, and any of the aggregates used are not listed on the approved list as specified in these special provisions, then the amount of mineral admixture shall not be less than 25 percent by mass of the total amount of cementitious material to be used in the mix.
 - 3. When the calcium oxide content of a mineral admixture is greater than 2 percent by mass and the fine and coarse aggregates are listed on the approved list as specified in these special provisions, then the amount of mineral admixture shall not be less than 15 percent by mass of the total amount of cementitious material to be used in the mix.
 - 4. When a mineral admixture that conforms to the provisions for silica fume in Section 90-2.04, "Admixture Materials," of the Standard Specifications is used, the amount of mineral admixture shall not be less than 10 percent by mass of the total amount of cementitious material to be used in the mix.
 - 5. When a mineral admixture that conforms to the provisions for silica fume in Section 90-2.04, "Admixture Materials," of the Standard Specifications is used and the fine and coarse aggregates are listed on the approved list as specified in these special provisions, then the amount of mineral admixture shall not be less than 7 percent by mass of the total amount of cementitious material to be used in the mix.
- C. The total amount of mineral admixture shall not exceed 35 percent by mass of the total amount of cementitious material to be used in the mix. Where Section 90-1.01, "Description," of the Standard Specifications specifies a maximum cementitious content in kilograms per cubic meter, the total mass of cement and mineral admixture per cubic meter shall not exceed the specified maximum cementitious material content.

The Contractor will be permitted to use Type III portland cement for concrete used in the manufacture of precast concrete members.

8-2.02 CEMENT AND WATER CONTENT

The amount of free water used in concrete for deck slabs of bridges and structure approach slabs shall not exceed 325 pounds per cubic yard, plus 20 pounds for each required 100 pounds of cementitious material in excess of 658 pounds per cubic yard.

SECTION 8-3. WELDING

8-3.01 WELDING

GENERAL

Flux core welding electrodes conforming to the requirements of AWS A5.20 E6XT-4 or E7XT-4 shall not be used to perform any type of welding for this project.

Wherever reference is made to the following AWS welding codes in the Standard Specifications, on the plans, or in these special provisions, the year of adoption for these codes shall be as listed:

AWS Code	Year of Adoption
D1.1	2000
D1.4	1992
D1.5	1995

Requirements of the AWS welding codes shall apply unless specified otherwise in the Standard Specifications, on the plans, or in these special provisions. Wherever the abbreviation AWS is used, it shall be equivalent to the abbreviations ANSI/AWS or ANSI/AASHTO/AWS.

Sections 6.1.2 through 6.1.4.3 of AWS D 1.1, Sections 7.1.1 and 7.1.2 of AWS D 1.4, and Sections 6.1.1.1 through 6.1.3.3 of AWS D 1.5 are replaced with the following:

Quality Control (QC) shall be the responsibility of the Contractor. As a minimum, the Contractor shall perform inspection and testing prior to welding, during welding, and after welding as specified in this section and additionally as necessary to ensure that materials and workmanship conform to the requirements of the contract documents.

The QC Inspector shall be the duly designated person who acts for and on behalf of the Contractor for inspection, testing, and quality related matters for all welding.

Quality Assurance (QA) is the prerogative of the Engineer. The QA Inspector is the duly designated person who acts for and on behalf of the Engineer.

Each QC Inspector shall be responsible for quality control acceptance or rejection of materials and workmanship, and shall be currently certified as an AWS Certified Welding Inspector (CWI) in conformance with the requirements in AWS QC1, "Standard and Guide for Qualification of Welding Inspectors."

The QC Inspector may be assisted by an Assistant QC Inspector provided that this individual is currently certified as an AWS Certified Associate Welding Inspector (CAWI) in conformance with the requirements in AWS QC1, "Standard and Guide for Qualification of Welding Inspectors," or has equivalent qualifications. The QC Inspector shall monitor the Assistant QC Inspector's work, and shall be responsible for signing all reports.

When the term "Inspector" is used without further qualification, it shall refer to the QC Inspector.

Section 6.14.6, "Personnel Qualification," of AWS D 1.1, Section 7.7.6, "Personnel Qualification," of AWS D 1.4, and Section 6.1.3.4, "Personnel Qualification," of AWS D 1.5 are replaced with the following:

Personnel performing nondestructive testing (NDT) shall be qualified in conformance with the requirements of the American Society for Nondestructive Testing (ASNT) Recommended Practice No. SNT-TC-1A and the Written Practice of the NDT firm. The Written Practice of the NDT firm shall meet or exceed the requirements of the ASNT Recommended Practice No. SNT-TC-1A. Only individuals who are 1) qualified for NDT Level II, or 2) Level III technicians who have been directly certified by the ASNT and are authorized to perform the work of Level II technicians, shall perform NDT, review the results, and prepare the written reports.

Section 6.5.4, "Scope of Examination," of AWS D 1.1 and Section 7.5.4 of AWS D 1.4 are replaced with the following:

The QC Inspector shall inspect and approve the joint preparation, assembly practice, welding techniques, and performance of each welder, welding operator, and tack welder to make certain that the applicable requirements of this code and the approved welding procedure specification (WPS) are met.

Section 6.5.4 of AWS D 1.5 is replaced with the following:

The QC Inspector shall inspect and approve the joint preparation, assembly practice, welding techniques, and performance of each welder, welding operator, and tack welder to make certain that the applicable requirements of this code and the approved WPS are met. The QC Inspector shall examine the work to make certain that it meets the requirements of Sections 3 and 9.21. The size and contour of welds shall be measured using suitable gages. Visual inspection for cracks in welds and base metal, and for other discontinuities should be aided by strong light magnifiers, or such other devices as may be helpful. Acceptance criteria different from those specified in this code may be used when approved by the Engineer.

Section 6.6.5, "Nonspecified Nondestructive Testing Other Than Visual," of AWS D 1.1, Section 6.6.5 of AWS D 1.4 and Section 6.6.5 of AWS D 1.5 shall not apply.

For any welding, the Engineer may direct the Contractor to perform NDT that is in addition to the visual inspection or NDT specified in the AWS welding codes, in the Standard Specifications, or in these special provisions. Additional NDT required by the Engineer, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Should any welding deficiencies be discovered by this additional NDT, the cost of the testing will not be paid for as extra work but shall be at the Contractor's expense.

Required repair work to correct welding deficiencies, whether discovered by the required visual inspection or NDT, or by additional NDT directed by the Engineer, and any associated delays or expenses caused to the Contractor by performing these repairs, shall be at the Contractor's expense.

The Engineer shall have the authority to verify the qualifications or certifications of any welder, QC Inspector, or NDT personnel to specified levels by retests or other means.

A sufficient number of QC Inspectors shall be provided to ensure continuous inspection when any welding is being performed. Continuous inspection, as a minimum, shall include (1) having QC Inspectors continually present when any welding operation is being performed, or (2) having a QC Inspector within such close proximity of all welding operations that inspections by the QC Inspector of each operation, at each welding location, shall not lapse for a period exceeding 30 minutes.

Inspection and approval of the joint preparation, assembly practice, welding techniques, and performance of each welder, welding operator, and tack welder shall be documented by the QC Inspector on a daily basis for each day that welding is performed.

When joint details that are not prequalified by the applicable AWS codes are proposed for use in the work, welders using these details shall perform a qualification test plate using the approved WPS variables and the joint detail to be used in production. The test plate shall be the maximum thickness to be used in production. The test plate shall be mechanically or radiographically tested as directed by the Engineer. Mechanical and radiographic testing and acceptance criteria shall be as specified in the applicable AWS codes.

The period of effectiveness for a welder's or welding operator's qualification shall be a maximum of 3 years for the same weld process, welding position, and weld type. A valid qualification at the beginning of work on a contract will be acceptable for the entire period of the contract, as long as the welder's work remains satisfactory.

WELDING QUALITY CONTROL

Welding quality control shall conform to the requirements in the AWS welding codes, the Standard Specifications, and these special provisions.

Unless otherwise specified, welding quality control shall apply when any work is welded in conformance with the provisions in Section 49, "Piling," Section 52, "Reinforcement," Section 55, "Steel Structures," Section 56-1, "Overhead Sign Structures," Section 75-1.035, "Bridge Joint Restrainer Units," or Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications.

The welding of fracture critical members (FCMs) shall conform to the provisions specified in the Fracture Control Plan (FCP) and herein.

The Contractor shall designate in writing a welding Quality Control Manager (QCM). The QCM shall be responsible directly to the Contractor for the quality of welding, including materials and workmanship, performed by the Contractor and subcontractors.

The QCM shall be the sole individual responsible to the Contractor for submitting, receiving, and approving all correspondence, required submittals, and reports to and from the Engineer.

The QCM shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors, who will provide other services or materials for the project. The QCM may be an employee of the Contractor.

Welding inspection personnel or NDT firms to be used in the work shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors, who will provide other services or materials for the project, except for the following conditions:

- A. The welding is performed at a permanent fabrication facility which is certified under the AISC Quality Certification Program, Category Cbr, Major Steel Bridges.
- B. The welding is performed at a permanent fabrication facility which is certified under the AISC Quality Certification Program, Category Sbd, Conventional Steel Building Structures. This condition shall apply only for work welded in conformance with the provisions in Section 56-1, "Overhead Sign Structures" or Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications.

For welding performed at such certified facilities, the inspection personnel or NDT firms may be employed or compensated by the fabrication facility performing the welding.

Prior to submitting the Welding Quality Control Plan (WQCP) required herein, a pre-welding meeting between the Engineer, Contractor, and any entity performing welding for this project, shall be held to discuss the requirements for the WQCP.

Except for work that is welded in conformance with Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications, prior to performing any welding, the Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 3 copies of a separate WQCP for each item of work for which welding is to be performed.

Prior to furnishing materials welded in conformance with Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications, the Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 3 copies of a separate WQCP for each fabrication facility supplying these materials or proof of previous Engineer approval of a WQCP for such a facility no more than one year prior to the delivery of materials for inspection.

As a minimum, each WQCP shall include the following:

- A. The name of the welding firm and any required NDT firms;
- B. A manual prepared by the NDT firm that shall include equipment, testing procedures, code of safe practices, the Written Practice of the NDT firm, and the names, qualifications, and documentation of certifications for all personnel to be used;
- C. The name of the QCM and the names, qualifications, and documentation of certifications for all QC Inspectors and Assistant QC Inspectors to be used;
- D. An organizational chart showing all QC personnel and their assigned QC responsibilities;
- E. The methods and frequencies for performing all required quality control procedures, including QC inspection forms to be used, as required by the specifications including:
 - 1. all visual inspections;
 - 2. all NDT including radiographic geometry, penetrometer and shim selection, film quality, film processing, radiograph identification and marking system, and film interpretation and reports; and
 - 3. calibration procedures and calibration frequency for all NDT equipment;
- F. A system for the identification and tracking of all welds, NDT, and any required repairs, and a procedure for the reinspection of repaired welds. The system shall have provisions for 1) permanently identifying each weld and the person who performed the weld, 2) placing all identification and tracking information on each radiograph, 3) a method of reporting nonconforming welds to the Engineer, and 4) a method of documentation of repairs and reinspection of nonconforming welds;
- G. Standard procedures for performing noncritical repair welds. Noncritical repair welds are defined as welds to deposit additional weld beads or layers to compensate for insufficient weld size and to fill limited excavations that were performed to remove unacceptable edge or surface discontinuities, rollover or undercut. The depth of these excavations shall not exceed 65 percent of the specified weld size;
- H. The WPS, including documentation of all supporting Procedure Qualification Record (PQR) tests performed, and the name of the testing laboratory who performed the tests, to verify the acceptability of the WPS. The submitted WPS shall be within the allowable period of effectiveness;

- I. Documentation of all certifications for welders for each weld process and position that will be used. Certifications shall list the electrodes used, test position, base metal and thickness, tests performed, and the witnessing authority. All certifications shall be within the allowable period of effectiveness;
- J. One copy each of all AWS welding codes and the FCP which are applicable to the welding to be performed. These codes and the FCP shall become the permanent property of the Department; and
- K. Forms to be used for Certificates of Compliance, daily production logs, and daily reports.

The Engineer shall have 10 working days to review the WQCP submittal after a complete plan has been received. Except for work that is welded in conformance with Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications, no welding shall be performed until the WQCP is approved in writing by the Engineer. No materials welded in conformance with Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications, shall be incorporated into the work until the WQCP is approved in writing by the Engineer. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the WQCP, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

An amended WQCP or addendum shall be submitted to, and approved in writing by the Engineer, for proposed revisions to the approved WQCP. An amended WQCP or addendum will be required for revisions to the WQCP, including but not limited to a revised WPS, additional welders, changes in NDT firms or procedures, QC, or NDT personnel, or updated systems for tracking and identifying welds. The Engineer shall have 3 working days to complete the review of the amended WQCP or addendum. Work that is affected by any of the proposed revisions shall not be performed until the amended WQCP or addendum has been approved. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the amended WQCP or addendum, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

After final approval of the WQCP, amended WQCP, or addendum, the Contractor shall submit 7 copies to the Engineer of each of these approved documents.

It is expressly understood that the Engineer's approval of the Contractor's WQCP shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work in conformity with the requirements of the plans and specifications. The Engineer's approval shall not constitute a waiver of any requirement of the plans and specifications nor relieve the Contractor of any obligation thereunder, and defective work, materials, and equipment may be rejected notwithstanding approval of the WQCP.

A daily production log for welding shall be kept by the QCM for each day that welding is performed. The log shall clearly indicate the locations of all welding, except partial penetration longitudinal seam welds performed in conformance with Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications. The log shall include the welders' names, amount of welding performed, any problems or deficiencies discovered, and any testing or repair work performed, at each location. The daily report from each QC Inspector shall also be included in the log.

The following items shall be included in a Welding Report that is to be submitted to the Engineer within 7 days following the performance of any welding. For work welded in conformance with Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications, the following items shall be included in a Welding Report that is to be submitted to the Engineer 48 hours prior to the Contractor furnishing a Certificate of Compliance for the material:

- A. Reports of all visual weld inspections and NDT;
- B. Radiographs and radiographic reports, and other required NDT reports;
- C. Documentation that the Contractor has evaluated all radiographs and other nondestructive tests and corrected all rejectable deficiencies, and all repaired welds have been reexamined by the required NDT and found acceptable; and
- D. Daily production log.

Radiographic envelopes shall have clearly written on the outside of the envelope the following information: name of the QCM, name of the nondestructive testing firm, name of the radiographer, date, contract number, complete part description, and all included weld numbers or a report number, as detailed in the WQCP. In addition, all innerleaves shall have clearly written on them the part description and all included weld numbers, as detailed in the WQCP.

Reports regarding NDT, including radiographs, shall be signed by both the NDT technician and the person that performed the review, and then submitted directly to the QCM for review and signature prior to submittal to the Engineer. Corresponding names shall be clearly printed or typewritten next to all signatures.

The Engineer will review the Welding Report to determine if the Contractor is in conformance with the WQCP. Unless otherwise specified, the Engineer shall be allowed 7 working days to review the report and respond in writing after a complete Welding Report has been received. Prior to receiving notification from the Engineer of the Contractor's conformance with the WQCP, the Contractor may encase in concrete or cover welds for which a Welding Report has been submitted. However, should the Contractor elect to encase or cover those welds prior to receiving notification from the Engineer, it is expressly understood that the Contractor shall not be relieved of the responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Material not conforming to these requirements will be subject to rejection. Should the Contractor elect to wait to encase or cover welds pending notification by the Engineer, and should the Engineer fail to complete the review and provide notification within this time allowance, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in notification, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The QC Inspector shall provide reports to the QCM on a daily basis for each day that welding is performed.

Except for noncritical weld repairs, the Engineer shall be notified immediately in writing when welding problems, deficiencies, base metal repairs, or any other type of repairs not submitted in the WQCP are discovered and also of the proposed repair procedures to correct them. The Engineer shall have 5 working days to review these procedures. No remedial work shall begin until the repair procedures are approved in writing by the Engineer. Should the Engineer fail to complete the review within this time allowance, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the proposed repair procedures, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The QCM shall sign and furnish to the Engineer, a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each item of work for which welding was performed. The certificate shall state that all of the materials and workmanship incorporated in the work, and all required tests and inspections of this work, have been performed in conformance with the details shown on the plans and the provisions of the Standard Specifications and these special provisions.

PAYMENT

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

SECTION 9. DESCRIPTION OF BRIDGE WORK

The bridge work to be done consists, in general, of widening the following structures, as shown on the plans:

Rio Hondo Bridge (Widen) (Bridge No. 53-0657).

Widening an existing 6-span structure approximately 469 feet long with a cast-in-place reinforced concrete box girder.

Santa Anita Avenue Undercrossing (Widen) (Bridge No. 53-0658).

Widening an existing 1-span structure approximately 85 feet long with precast prestressed concrete girders.

Lexington Avenue Undercrossing (Widen) (Bridge No. 53-0883).

Widening an existing 1-span structure approximately 65 feet long with a cast-in-place prestressed concrete box girder and a reinforced concrete box girder.

Tyler Avenue Undercrossing (Widen) (Bridge No. 53-0659).

Widening an existing 2-span structure approximately 103 feet long with a cast-in-place prestressed concrete slab and a cast-in-place reinforced concrete box girder.

Utah Street Pedestrian Undercrossing (Widen)
(Bridge No. 53-1028).

Widening an existing 1-span structure approximately 8 feet long with a cast-in-place reinforced box tunnel.

Meeker Road Undercrossing (Widen)
(Bridge No. 53-1029).

Widening an existing 1-span structure approximately 56 feet long with cast-in-place prestressed voided concrete slabs.

Peck Road Undercrossing (Widen)
(Bridge No. 53-0661).

Widening an existing 2-span structure approximately 139 feet long with precast prestressed concrete girders.

Valley Boulevard Undercrossing (Widen)
(Bridge No. 53-0660).

Widening an existing 2-span structure approximately 154 feet long with precast prestressed concrete girders.

East El Monte Overhead (Widen)
(Bridge No. 53-0867).

Widening an existing 2-span structure approximately 215 feet long with composite welded steel plate girders.

Stewart Street OR Undercrossing (Widen)
(Bridge No. 53-1030).

Widening an existing box structure approximately 58 feet long with a reinforced concrete box girder and a reinforced concrete rigid frame.

Cogswell Road Undercrossing (Widen)
(Bridge No. 53-0662).

Widening an existing 1-span structure approximately 65 feet long with precast prestressed concrete girders.

Durfee Avenue Undercrossing (Widen)
(Bridge No. 53-1031).

Widening an existing 2-span structure approximately 106 feet long with cast-in-place prestressed concrete slabs.

Garvey Avenue Off-Ramp Undercrossing (Widen)
(Bridge No. 53-1032).

Widening an existing 1-span structure approximately 97 feet long with a cast-in-place prestressed concrete box girder.

San Gabriel River Bridge (Widen)
(Bridge No. 53-0109).

Widening an existing 13-span structure approximately 758 feet long with cast-in-place reinforced concrete T-beams.

The bridge work to be done consists, in general, of installing fiber optic cable and lighting conduits in the following structures, as shown on the plans:

Rio Hondo Bridge
(Bridge No. 53-0657)

Santa Anita Avenue Undercrossing
(Bridge No. 53-0658)

Lexington Avenue Undercrossing
(Bridge No. 53-0683)

Tyler Avenue Undercrossing
(Bridge No. 53-0659)

Utah Avenue Pedestrian Undercrossing
(Bridge No. 53-1028)

Meeker Road Undercrossing
(Bridge No. 53-1029)

Peck Road Undercrossing
(Bridge No. 53-0661)

SECTION 10. CONSTRUCTION DETAILS

SECTION 10-1. GENERAL

10-1.01 CONSTRUCTION PROJECT FUNDING IDENTIFICATION

Before any major physical construction work readily visible to highway users is started on this contract, the Contractor shall furnish and erect 2 Type 2 (Modified) Construction Project Funding Identification Signs, including any relocation at the locations shown on the plans or where designated by the Engineer.

The signs and overlays shall be of a type and material consistent with the estimated time of completion of the project and shall conform to the details shown on the plans.

The sign letters, border and the Department's construction logos shall conform to the colors (non-reflective) and details shown on the plans, and shall be on a white background (non-reflective). The colors blue and orange shall conform to the PR Color Number 3 and Number 6, respectively, as specified in the Federal Highway Administration's Color Tolerance Chart.

The sign message to be used for fund types shall be as shown on the plans.

The sign message to be used for type of work shall consist of the following:

HIGHWAY CONSTRUCTION

The sign message to be used for the Year of Completion of Project Construction will be furnished by the Engineer. The Contractor shall furnish and install the "Year" sign overlay within 10 working days of notification of the year date to be used.

The letter sizes to be used shall be as shown on the plans. The information shown on the signs shall be limited to that shown on the plans.

The signs shall be kept clean and in good repair by the Contractor.

Upon completion of the work, the signs shall be removed and disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13 of the Standard Specifications.

Full compensation for furnishing, erecting, maintaining, relocating and removing and disposing of the construction project information signs shall be considered as included in the contract lump sum price paid for construction area signs and no additional compensation will be allowed therefor.

10-1.02 ORDER OF WORK

Order of work shall conform to the provisions in Section 5-1.05, "Order of Work," of the Standard Specifications and these special provisions.

The first order of work shall be to place the order for electrical equipment including the communication systems, fiber optic cables and interim ramp metering system equipment and to complete all work related to "Interim Ramp Metering System (MVDS Locations)," as shown on the plans. The Contractor shall furnish the Engineer with a statement from the vendor that the order for electrical equipment including the communication systems, fiber optic cables and interim ramp metering system equipment has been received and accepted by the vendor.

Attention is directed to "Maintaining Traffic" and "Temporary Pavement Delineation" of these special provisions and to the stage construction sheets of the plans.

Attention is directed to "Progress Schedule (Critical Path Method)" of these special provisions regarding the submittal of a general time-scaled logic diagram within 10 days after approval of the contract. The diagram shall be submitted prior to performing any work that may be affected by any proposed deviations to the construction staging of the project.

Bridge widening at Santa Anita Avenue Undercrossing, Bridge No. 53-0658, including other roadwork shown under Stage 1 Construction that will impact the traffic flow at Santa Anita Avenue, shall not begin before January 1, 2002.

The work shall be performed in conformance with the stages of construction shown on the plans. Nonconflicting work in subsequent stages may proceed concurrently with work in preceding stages, provided satisfactory progress is maintained in the preceding stages of construction and except for any work that requires a mainline freeway closure during the period of lane closure abeyance.

Placing temporary railing (Type K) shall not precede any work by more than 5 working days.

In each stage, after completion of the preceding stage, the first order of work shall be the removal of existing pavement delineation as directed by the Engineer. Pavement delineation removal shall be coordinated with new delineation so that lane lines are provided at all times on traveled ways open to public traffic.

Before obliterating any pavement delineation that is to be replaced on the same alignment and location, as determined by the Engineer, the pavement delineation shall be referenced by the Contractor, with a sufficient number of control points to reestablish the alignment and location of the new pavement delineation. The references shall include the limits or changes in striping pattern, including one- and two-way barrier lines, limit lines, crosswalks and other pavement markings. Full compensation for referencing pavement delineation shall be considered as included in the contract prices paid for new pavement delineation and no additional compensation will be allowed therefor.

Concrete barrier at the left widening of Garvey Avenue Offramp Undercrossing, Bridge No. 53-1032, shall be constructed after the superstructure is lowered to the final grade.

When removing and replacing restrainers, not more than 50 percent of the existing restrainers shall be removed at any time at any joint without being replaced with an equal proportion of new restrainers which are anchored in accordance with the details shown on the plans. Removal and replacement shall be done symmetrically about the centerline of the existing bridge.

Ramps SR1, SL1, PR1, PL2 and VL2 shall not be closed during periods which include the following dates:

The last Monday in May

The first Monday in September

From December 24 to January 1, inclusive

Construction of Ramp GL-1 shall precede widening of Garvey Avenue Undercrossing.

Construction of Ramps SR1 and SL1 shall be completed within 40 working days of the first day of closure.

Construction of Ramps PR1 and PL2 shall be completed within 20 working days of the first day of closure.

Construction of Ramp VL2 shall be completed within 40 working days of the first day of closure.

Attention is directed to backfilling requirements shown on the plans for bridges with strutted abutments.

The sound wall on edge beam at Stewart Street Onramp Undercrossing, Bridge No. 53-1030, shall not be constructed until all falsework has been released.

The Contractor shall furnish preconstruction shotcrete test panels as described in "Shotcrete" of these special provisions.

At the end of each working day if a difference in excess of 0.15-foot exists between the elevation of the existing pavement and the elevation of any excavation within 5 feet left of the traveled way and 8 feet right of the traveled way, material shall be placed and compacted against the vertical cuts adjacent to the traveled way. During excavation operations, native material may be used for this purpose, however, once the placing of the structural section commences, structural material shall be used. The material shall be placed to the level of the elevation of the top of existing pavement and tapered at a slope of 4:1 or flatter to the bottom of the excavation. Treated base shall not be used for the taper. Full compensation for placing the material on a 4:1 slope, regardless of the number of times it is required, and subsequent removing or reshaping of the material to the lines and grades shown on the plans shall be considered as included in the contract price paid for the

materials involved and no additional compensation will be allowed therefor. No payment will be made for material placed in excess of that required for the structural section.

Existing pavement shall be restriped and temporary railing (Type K) placed before excavation operations.

Attention is directed to "Relations with California Department of Fish and Game" and "Relations with California Regional Water Quality Board" of these special provisions for time and operational constraints regarding construction in streambeds.

At those locations exposed to public traffic where guard railings or barriers are to be constructed, reconstructed, or removed and replaced, the Contractor shall schedule operations so that at the end of each working day there shall be no post holes open nor shall there be any railing or barrier posts installed without the blocks and rail elements assembled and mounted thereon.

Not less than 60 days prior to planting the plants, the Contractor shall furnish the Engineer a statement from the vendor that the order for the plants required for this contract, including inspection plants, has been received and accepted by the vendor. The statement from the vendor shall include the names, sizes, and quantities of plants ordered and the anticipated date of delivery.

The Contractor shall place orders for replacement plants with the vendor at the appropriate time so that the roots of the replacement plants are not in a root-bound condition.

Not less than 60 days prior to applying seeds, the Contractor shall furnish the Engineer a statement from the vendor that the order for the seed required for this contract has been received and accepted by the vendor. The statement from the vendor shall also include the names and quantity of seed ordered and the anticipated date of delivery.

Attention is directed to the requirements specified under "Wildflower Seeding" elsewhere in these special provisions, regarding time restrictions for planting operations and seed application.

Attention is directed to "Maintain Existing Plants" of these special provisions regarding checking for deficiencies of existing plants that are to remain in place, prior to the start of irrigation work.

Attention is directed to "Irrigation Systems Functional Test" of these special provisions, regarding restrictions for planting operations.

Unless otherwise shown on the plans or specified in these special provisions, conduits to be jacked or drilled for water line crossovers and sprinkler control crossovers shall be installed prior to the installation of other pipe supply lines.

Clearing, grubbing, and earthwork operations shall not be performed in areas where existing irrigation facilities are to remain in place until existing irrigation facilities have been checked for proper operation in conformance with the provisions in "Highway Planting and Irrigation Systems" of these special provisions.

Existing conduits to be extended shall be located in conformance with the provisions in "Extend Irrigation Crossovers" of these special provisions prior to the start of other work in these areas.

Attention is directed to Section 20-5.027B, "Wiring Plans and Diagrams," of the Standard Specifications regarding submittal of working drawings.

Attention is directed to "Irrigation Controller Enclosure Cabinet" of these special provisions regarding preinstalling irrigation components in the irrigation controller enclosure cabinet prior to field installation.

10-1.03 WATER POLLUTION CONTROL (STORM WATER POLLUTION PREVENTION PLAN)

Water pollution control work shall conform to the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications and these special provisions.

This project lies within the boundaries of the Los Angeles Regional Water Quality Control Board and shall conform to the requirements of the National Pollutant Discharge Elimination System (NPDES) Permit for General Construction Activities No. CAS000002, Order No, 99-08-DWQ, and the NPDES Permit for the State of California Department of Transportation Properties, Facilities, and Activities, No. CAS000003, Order No, 99-06-DWQ issued by the State Water Resources Control Board. These permits, hereafter referred to as the "Permits," regulate storm water discharges associated with construction activities.

Water pollution control work shall conform to the requirements in the "Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual" and the "Construction Site Best Management Practices (BMPs) Manual," and addenda thereto issued up to, and including, the date of advertisement of the project, hereafter referred to respectively as the "Preparation Manual" and the "Construction Site BMP Manual" and collectively as the "Manuals." Copies of the Manuals and the Permits may be obtained from the Department of Transportation, Material Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520. Copies of the Manuals may also be obtained from the Department's Internet Web Site at: <http://www.dot.ca.gov/hq/construc/stormwater.html>.

The Contractor shall know and fully comply with the applicable provisions of the Manuals, Permits, and Federal, State, and local regulations that govern the Contractor's operations and storm water discharges from both the project site and areas of disturbance outside the project limits during construction. The Contractor shall maintain copies of the Permits at the project site and shall make the Permits available during construction.

Unless arrangements for disturbance or use of areas outside the project limits are made by the Department and made part of the contract, it is expressly agreed that the Department assumes no responsibility for the Contractor or property owner with respect to any arrangements made between the Contractor and property owner. The Contractor shall implement, inspect and maintain all necessary water pollution control practices to satisfy all applicable Federal, State, and Local laws and regulations that govern water quality for areas used outside of the highway right-of-way or areas arranged for the specific use of the Contractor for this project. Installing, inspecting, and maintaining water pollution control practices on areas outside the highway right-of-way not specifically arranged for and provided for by the Department for the execution of this contract will not be paid for.

The Contractor shall be responsible for the costs and for liabilities imposed by law as a result of the Contractor's failure to comply with the provisions set forth in this section "Water Pollution Control", including but not limited to, compliance with the applicable provisions of the Manuals, Permits and Federal, State and local regulations. Costs and liabilities include, but are not limited to, fines, penalties, and damages whether assessed against the State or the Contractor, including those levied under the Federal Clean Water Act and the State Porter Cologne Water Quality Act.

In addition to the remedies authorized by law, money due the Contractor under the contract, in an amount determined by the Department, may be retained by the State of California until disposition has been made of the costs and liabilities.

When a regulatory agency or other third party identifies a failure to comply with the permit or any other local, State, or federal requirement, the Engineer may retain money due the Contractor, subject to the following:

- A. The Department will give the Contractor 30 days notice of the Department's intention to retain funds from partial payments which may become due to the Contractor prior to acceptance of the contract. Retention of funds from payments made after acceptance of the contract may be made without prior notice to the Contractor.
- B. No retention of additional amounts out of partial payments will be made if the amount to be retained does not exceed the amount being withheld from partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications.
- C. If the Department has retained funds and it is subsequently determined that the State is not subject to the costs and liabilities in connection with the matter for which the retention was made, the Department shall be liable for interest on the amount retained for the period of the retention, and the rate of interest payable shall be 6 percent per annum.

Conformance with the provisions of this section "Water Pollution Control" shall not relieve the Contractor from the Contractor's responsibilities, as provided in Section 7, "Legal Relations and Responsibilities," of the Standard Specifications.

The Contractor shall notify the Engineer immediately upon request from the regulatory agencies to enter, inspect, sample, monitor or otherwise access the project site or the Contractor's records pertaining to water pollution control work.

STORM WATER POLLUTION PREVENTION PLAN PREPARATION, APPROVAL AND AMENDMENTS

As part of the water pollution control work, a Storm Water Pollution Prevention Plan, hereafter referred to as the "SWPPP," is required for this contract. The SWPPP shall conform to the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications, the requirements in the Manuals, the requirements of the Permits, and these special provisions. Upon the Engineer's approval of the SWPPP, the SWPPP shall be considered to fulfill the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications for development and submittal of a Water Pollution Control Program.

No work having potential to cause water pollution, as determined by the Engineer, shall be performed until the SWPPP has been approved by the Engineer.

The Contractor shall designate a Water Pollution Control Manager. The Water Pollution Control Manager shall be responsible for the preparation of the SWPPP and any required modifications or amendments and shall be responsible for the implementation and adequate functioning of the various water pollution control practices employed. The Water Pollution Control Manager shall serve as the primary contact for all issues related to the SWPPP or its implementation. The Contractor shall submit to the Engineer a statement of qualifications, describing the training, previous work history and expertise of the individual selected by the Contractor to serve as Water Pollution Control Manager. The Engineer will reject the Contractor's submission of a Water Pollution Control Manager if the submitted qualifications are deemed to be inadequate.

Within 30 days after the approval of the contract, the Contractor shall submit 3 copies of the draft SWPPP to the Engineer. The Engineer will have 15 days to review the SWPPP. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the SWPPP within 15 days of receipt of the Engineer's comments. The Engineer will have 10 days to review the revisions. Upon the Engineer's approval of the SWPPP, 4 approved copies of the SWPPP, incorporating the required changes, shall be submitted to the Engineer. In order to allow construction activities to proceed, the Engineer may conditionally approve the SWPPP while minor revisions are being completed. If the Engineer does not review or approve the SWPPP within the time specified, compensation will be made in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The SWPPP shall apply to all areas that are directly related to construction including, but not limited to, staging areas, storage yards, material borrow areas, and access roads within or outside of the highway right-of-way.

The SWPPP shall incorporate water pollution control practices in the following six categories:

- A. Soil stabilization;
- B. Sediment control;
- C. Wind erosion control;
- D. Tracking control;
- E. Non-storm water control; and
- F. Waste management and material pollution control.

The Contractor shall develop a Water Pollution Control Schedule that shall describe the timing of grading or other work activities that could affect water pollution. The Water Pollution Control Schedule shall be updated by the Contractor to reflect any changes in the Contractor's operations that would affect the necessary implementation of water pollution control practices.

The Contractor shall incorporate the "Minimum Requirements" presented in the Preparation Manual into the SWPPP. In addition to the "Minimum Requirements" presented in the Preparation Manual, the Contractor shall complete the BMP Consideration Checklist presented in the Preparation Manual. The Contractor shall identify and incorporate into the SWPPP the water pollution control practices selected by the Contractor or as directed by the Engineer.

The following contract items of work, as shown on the project plans or as specified elsewhere in these special provisions, shall be identified in the SWPPP as permanent water pollution control practices: Rock Slope Protection and Wild Flower Seeding. These permanent water pollution control practices shall be constructed as specified in "Order of Work" of these special provisions, and utilized during the construction period. The Contractor shall maintain and protect the permanent water pollution control practices throughout the duration of the project and shall restore these controls to the lines, grades and condition shown on the plans prior to acceptance of the contract.

The SWPPP shall include, but not be limited to, the items described in the Manuals, Permits and related information contained in the contract documents. In addition the SWPPP shall include a copy of the following: United States Army Corps of Engineers Permit, California Regional Water Quality Control Board Permit, California Department of Fish and Game Permit, Los Angeles County Flood Control District Permit, and City of El Monte Permit.

The Contractor shall prepare an amendment to the SWPPP when there is a change in construction activities or operations which may affect the discharge of pollutants to surface waters, ground waters, municipal storm drain systems, or when the Contractor's activities or operations violate any condition of the Permits, or when directed by the Engineer. Amendments shall show additional water pollution control practices or revised operations, including those areas or operations not shown in the initially approved SWPPP. Amendments to the SWPPP shall be prepared, and submitted for review and approval in the same manner as specified for the SWPPP approval. Subsequent amendments shall be submitted within a time approved by the Engineer, but in no case longer than the time specified for the initial submittal and review of the SWPPP. At a minimum, the SWPPP shall be amended annually and submitted to the Engineer 25 days prior to the defined rainy season.

The Contractor shall keep one copy of the approved SWPPP and approved amendments at the project site. The SWPPP shall be made available upon request of a representative of the Regional Water Quality Control Board, State Water Resources Control Board, United States Environmental Protection Agency or the local storm water management agency. Requests by the public shall be directed to the Engineer.

COST BREAK-DOWN

The Contractor shall submit to the Engineer a cost break-down for the contract lump sum item of water pollution control, together with the SWPPP.

The cost break-down shall be completed and furnished in the format shown in the example of the cost break-down included in this section. Additional unit descriptions not shown in the example and the quantities of all water pollution control unit shall be determined and designated by the Contractor. The water pollution control units given in the example have been established as the minimum requirements specified for the SWPPP under this contract, and shall be included in the cost break-down furnished to the Engineer.

The Contractor shall determine the quantities required to complete the work of water pollution control. The quantities and their values shall be included in the cost break-down submitted to the Engineer for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-down submitted for approval. The cost break-down shall not include water pollution control practices which are shown on the plans and for which there is a separate contract item.

The sum of the amounts for the units of work listed in the cost break-down shall be equal to the contract lump sum price bid for water pollution control. Profit shall be included in each individual unit listed in the cost break-down. Attention is directed to "Overhead," of these special provisions. The cost break-down shall be submitted and approved within the same times specified for the SWPPP. Partial payment for the item of water pollution control will not be made until the cost break-down is approved, in writing, by the Engineer.

Adjustments in the items of work and quantities listed in the approved cost break-down shall be made when required to address amendments to the SWPPP, except when the adjusted items are paid for as extra work.

No adjustment in compensation will be made in the contract lump sum price paid for water pollution control due to differences between the quantities shown in the approved cost break-down and the quantities required to complete the work as shown on the approved SWPPP. No adjustment in compensation will be made for ordered changes to correct SWPPP work resulting from the Contractor's own operations or from the Contractor's negligence.

The approved cost break-down will be used to determine partial payments during the progress of the work and as the basis for calculating the adjustment in compensation for the item of water pollution control due to increases or decreases of quantities ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost break-down item, the adjustment in compensation will be determined in the same manner specified for increases and decreases in the quantity of a contract item of work in conformance with the provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications. If an ordered change requires a new item not on the approved cost break-down, the adjustment in compensation will be determined in the same manner specified for extra work in conformance with Section 4-1.03D, "Extra Work," of the Standard Specifications.

WATER POLLUTION CONTROL COST BREAK-DOWN

Contract No. 07-1069U4

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
Temporary Silt Fence	LF			
Temporary Cover	SQYD			
Temporary Drainage Inlet Protection	EA			
Temporary Erosion Control	SQYD			
Temporary Concrete Washout Facilities	EA			
Temporary Flared End Protection	EA			
Temporary Fiber Roll Check Dam	LF			
Temporary Straw Bale Barrier	LF			
Temporary Sand Bag Barrier	LF			
Temporary Stabilized Construction Entrance/Exit	EA			
Dewatering (Excavation)	LS	Lump Sum		
Paving Operations	LS	Lump Sum		
Material Delivery and Storage	LS	Lump Sum		
Spill Prevention and Control	LS	Lump Sum		
Solid Waste Management	LS	Lump Sum		
Scheduling	LS	Lump Sum		

TOTAL _____

SWPPP IMPLEMENTATION

Upon approval of the SWPPP, the Contractor shall be responsible throughout the duration of the project for installing, constructing, inspecting, maintaining, removing and disposing of the water pollution control practices included in the SWPPP and any amendments. Unless otherwise directed by the Engineer, the Contractor's responsibility for SWPPP implementation shall continue throughout any temporary suspension of work ordered in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. Requirements for installation, construction, inspection, maintenance, removal, and disposal of water pollution control practices are specified in the Manuals and these special provisions.

If the Contractor or the Engineer identifies a deficiency in any aspect of the implementation of the approved SWPPP or amendments, the deficiency shall be corrected immediately. The deficiency may be corrected at a later date and time if requested by the Contractor and approved by the Engineer in writing, but not later than the onset of precipitation. If the Contractor fails to correct the identified deficiency by the date agreed or prior to the onset of precipitation the project shall be in noncompliance. Attention is directed to Section 5-1.01, "Authority of the Engineer," of the Standard Specifications and the payment sections of these special provisions for possible noncompliance penalties.

If the Contractor fails to conform to the provisions of "Water Pollution Control (Storm Water Pollution Prevention Plan)," the Engineer may order the suspension of construction operations which create water pollution.

Implementation of water pollution control practices may vary by season. The Construction Site BMP Manual and these special provisions shall be followed for control practice selection of year round, rainy season and non-rainy season water pollution control practices.

Year-Round Implementation Requirements

The Contractor shall have a year-round program for implementing, inspecting and maintaining water pollution control practices for wind erosion control, tracking control, non-storm water control, and waste management and materials pollution control.

The National Weather Service weather forecast shall be monitored and used by the Contractor on a daily basis. An alternative weather forecast proposed by the Contractor may be used if approved by the Engineer. If precipitation is predicted, the necessary water pollution control practices shall be deployed prior to the onset of the precipitation.

Disturbed soil areas shall be considered active whenever the soil disturbing activities have occurred, continue to occur or will occur during the ensuing 21 days. Non-active areas shall be protected as prescribed in the Construction Site BMP Manual within 14 days of cessation of soil disturbing activities or prior to the onset of precipitation, whichever occurs first.

Rainy Season Requirements

Soil stabilization and sediment control practices conforming to the requirements in the Special Requirements and applicable Preparation Manual Minimum Requirements, shall be provided throughout the rainy season, defined as between October 1 and May 1.

An implementation schedule of required soil stabilization and sediment control practices for disturbed soil areas shall be completed not later than 20 days prior to the beginning of each rainy season. The implementation schedule shall identify the soil stabilization and sediment control practices to be implemented and the dates on which the implementation will be 25 percent, 50 percent and 100 percent complete, respectively. Construction activities beginning during the rainy season shall implement applicable soil stabilization and sediment control practices.

Throughout the defined rainy season, the active disturbed soil area of the project site shall be not more than 5 acres. The Engineer may approve, on a case-by-case basis, expansions of the active disturbed soil area limit. Soil stabilization and sediment control materials shall be maintained on site sufficient to protect the unprotected disturbed soil area. A detailed plan for the mobilization of sufficient labor and equipment shall be maintained to deploy the water pollution control practices required to protect the project site prior to the onset of precipitation events.

Non-Rainy Season Requirements

The non-rainy season shall be defined as all days outside the defined rainy season. The Contractor's attention is directed to the Construction Site BMP Manual for soil stabilization and sediment control implementation requirements on disturbed soil areas during the non-rainy season. Disturbed soil areas within the project shall be protected in conformance with the requirements in the Construction Site BMP Manual with an effective combination of soil stabilization and sediment control.

MAINTENANCE

To ensure the proper implementation and functioning of water pollution control practices, the Contractor shall regularly inspect and maintain the construction site for the water pollution control practices identified in the SWPPP. The construction site shall be inspected by the Contractor as follows:

- A. Prior to a forecast storm;
- B. After a precipitation event which causes site runoff;
- C. At 24 hour intervals during extended precipitation events;
- D. Routinely, a minimum of once every two weeks outside of the defined rainy season;
- E. Routinely, a minimum of once every week during the defined rainy season.

The Contractor shall use the Storm Water Quality Construction Site Inspection Checklist provided in the Construction Site - Best Management Practices (BMP's) Manual or an alternative inspection checklist provided by the Engineer. One copy of each site inspection record shall be submitted to the Engineer within 24 hours of completing the inspection.

REPORTING REQUIREMENTS

Report of Discharges, Notices or Orders

If the Contractor identifies any discharge into receiving waters in a manner causing, or potentially causing, a condition of pollution, or if the project receives a written notice or order from any regulatory agency, the Contractor shall immediately inform the Engineer. The Contractor shall submit a written report to the Engineer within 7 days of the discharge event, notice, or order. The report shall include the following information:

- A. The date, time, location, nature of the operation, and type of discharge, including the cause or nature of the notice or order.
- B. The water pollution control practices deployed before the discharge event, or prior to receiving the notice or order.
- C. The date of deployment and type of water pollution control practices deployed after the discharge event, or after receiving the notice, or order, including additional measures installed or planned to reduce or prevent reoccurrence.
- D. An implementation and maintenance schedule for any affected water pollution control practices.

Report of First-Time Non-Storm Water Discharge

The Contractor shall notify the Engineer at least 3 days in advance of each first-time non-storm water discharge event, excluding exempted discharges. The Contractor shall notify the Engineer of each different operation causing a non-storm water discharge and shall obtain field approval for each first-time non-storm water discharge. Non-storm water discharges shall be monitored at each first-time occurrence and routinely thereafter.

Annual Certifications

By June 15 of each year, the Contractor shall complete and submit an Annual Construction Activity Certification as contained in the Preparation Manual to the Engineer.

PAYMENT

The contract lump sum price paid for prepare storm water pollution prevention plan shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in developing, preparing, obtaining approval of, revising, and amending the SWPPP, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Attention is directed to Section 9-1.06, "Partial Payments," and Section 9-1.07, "Payment After Acceptance," of the Standard Specifications. Payments for prepare storm water pollution prevention plan will be made as follows:

- A. After the SWPPP has been approved by the Engineer, 75 percent of the contract item price for prepare storm water pollution prevention plan will be included in the monthly partial payment estimate; and
- B. After acceptance of the contract in conformance with the provisions in Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, payment for the remaining 25 percent of the contract item price for prepare storm water pollution prevention plan will be made in conformance with the provisions in Section 9-1.07.

The contract lump sum price paid for water pollution control shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing, constructing, removing, and disposing of water pollution control practices, including non-storm water and waste management and materials pollution water pollution control practices except those shown on the plans and for which there is a contract item of work, and excluding developing, preparing, obtaining approval of, revising, and amending the SWPPP, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The cost of maintaining the temporary water pollution control practices shall be divided equally by the State and the Contractor as follows:

Soil Stabilization

All temporary water pollution control practices except:

SS-1 Scheduling

SS-2 Preservation of Existing Vegetation

Sediment Control

All temporary water pollution control practices.

Tracking Control

All temporary water pollution control practices except:

SC-7 Street Sweeping and Vacuuming

Wind Erosion Control

All temporary water pollution control practices.

Non-Storm Water Control

No sharing of maintenance costs will be allowed.

Waste Management & Material Control

No sharing of maintenance costs will be allowed.

The division of cost will be made by determining the cost of maintaining temporary water pollution control practices in conformance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications and paying to the Contractor one-half of that cost. Clean-up, repair, removal, disposal, improper installation, and replacement of temporary water pollution control practices damaged by the Contractor's negligence shall not be considered as included in the cost for performing maintenance and no additional compensation will be allowed therefor.

The provisions for sharing maintenance costs shall not relieve the Contractor from the responsibility for providing appropriate maintenance on those items where maintenance costs are not shared.

Full compensation for maintenance costs of water pollution control practices not shared, as specified in these special provisions, shall be considered as included in the contract lump sum price paid for water pollution control and no additional compensation will be allowed therefor.

Those water pollution control practices which are shown on the plans and for which there is a contract item of work will be measured and paid for as that contract item of work.

The Engineer will retain an amount equal to 25 percent of the estimated value of the contract work performed during estimate periods in which the Contractor fails to conform to the provisions of this section "Water Pollution Control," as determined by the Engineer.

Retention for failure to conform to the provisions in this section "Water Pollution Control" shall be in addition to the other retention provided for in the contract. The amounts retained for failure of the Contractor to conform to the provisions in this section will be released for payment on the next monthly estimate for partial payment following the date that an approved SWPPP has been implemented and maintained, and water pollution is adequately controlled, as determined by the Engineer.

10-1.04 TEMPORARY FENCES

Temporary fences shall be furnished, constructed, maintained, and later removed as shown on the plans, as specified in these special provisions and as directed by the Engineer.

24 inch security razor wire spaced 4 inches center to center shall be securely attached to the top of temporary fence.

Except as otherwise specified in this section, temporary fences shall conform to the plan details and the specifications for permanent fences of similar character as provided in Section 80, "Fences," of the Standard Specifications.

Used materials may be installed providing the used materials are good, sound, and are suitable for the purpose intended, as determined by the Engineer.

Materials may be commercial quality providing the dimensions and sizes of the materials are equal to, or greater than, the dimensions and sizes shown on the plans or specified herein.

Posts shall be either metal or wood at the Contractor's option.

Galvanizing and painting of steel items will not be required.
Treating wood with a wood preservative will not be required.
Concrete footings for metal posts will not be required.

Temporary fence that is damaged during the progress of the work shall be repaired or replaced by the Contractor at the Contractor's expense.

When no longer required for the work, as determined by the Engineer, temporary fence shall be removed. Removed facilities shall become the property of the Contractor and shall be removed from the site of the work, except as otherwise provided in this section.

Removed temporary fence materials that are not damaged may be constructed in the permanent work provided the materials conform to the requirements specified for the permanent work and such materials are new when used for the temporary fences.

Holes caused by the removal of temporary fences shall be backfilled in conformance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

The various types and kinds of temporary fence will be measured and paid for in the same manner specified for permanent fence of similar character as provided in Section 80, "Fences," of the Standard Specifications.

Full compensation for razor wire shall be considered as included in the contract price paid per linear foot for temporary fence (Type CL-6) and no additional compensation will be allowed therefor.

Full compensation for maintaining, removing, and disposing of temporary fence, including 24 inch razor wire shall be considered as included in the contract prices paid per linear foot for the various types of temporary fence and no additional compensation will be allowed therefor.

10-1.05 PRESERVATION OF PROPERTY

Attention is directed to the provisions in Section 7-1.11, "Preservation of Property," of the Standard Specifications and these special provisions.

Existing trees, shrubs and other plants, that are not to be removed as shown on the plans or specified in these special provisions, and are injured or damaged by reason of the Contractor's operations, shall be replaced by the Contractor. The minimum size of tree replacement and the minimum size of shrub replacement shall be 15-gallon. Replacement ground cover plants shall be from flats and shall be planted 12 inches on center. Replacement of *Carpobrotus* ground cover plants shall be from cuttings and shall be planted 12 inches on center. Replacement planting shall conform to the requirements in Section 20-4.07, "Replacement," of the Standard Specifications. The Contractor shall water replacement plants in conformance with the provisions in Section 20-4.06, "Watering," of the Standard Specifications.

Damaged or injured plants shall be removed and disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13 of the Standard Specifications. At the option of the Contractor, removed trees and shrubs may be reduced to chips. The chipped material shall be spread within the highway right of way at locations designated by the Engineer.

Replacement planting of injured or damaged trees, shrubs and other plants shall be completed prior to the start of the plant establishment period. Replacement planting shall conform to the provisions in Section 20-4.05, "Planting," of the Standard Specifications.

10-1.06 RELIEF FROM MAINTENANCE AND RESPONSIBILITY

The Contractor may be relieved of the duty of maintenance and protection for those items not directly connected with plant establishment work, except highway planting and irrigation systems in conformance with the provisions in Section 7-1.15, "Relief From Maintenance and Responsibility," of the Standard Specifications.

10-1.07 COOPERATION

Attention is directed to Sections 7-1.14, "Cooperation," and 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications and these special provisions.

In the event of a loss caused to the Contractor due to unnecessary delays or failure to finish the work within the time specified for completion caused by another contractor under contract with the Department performing work for the State, the State will reimburse the delayed contractor in conformance with the provisions in Section 8-1.09 "Right of Way Delays," of the Standard Specifications. Deductions will be made from moneys due or that may become due the contractor causing the loss or delay.

It is anticipated that the following work by other contractors may be in progress adjacent to or within the limits of this project during progress of the work on this contract:

Contract No. 07-008704 to perform highway planting in Baldwin Park on Route 10 at I-605 (KP 30.8/31.3).

Contract No. 07-202404 to grind and replace portland cement concrete pavement in Baldwin Park and Pomona on Route 10 from I-605 to SR 57 (KP 30.8/42.4).

Contract No. 07-1069U4

Contract No. 07-046074 to construct soundwalls in Baldwin Park from 0.1 km north of Route 10 to 0.7 km north of Route 10 (Route 605 KP 32.7/33.2).

Reconfiguration of the SONET (Synchronized Optical Network) and video path from the San Gabriel Valley Communication Hub Building (SGV HUB) to other hubs and the Traffic Management Center.

City of El Monte contract to construct storm drainage facilities along Santa Anita Avenue.

Progress schedules for the above contracts, when available, may be inspected by the Contractor at the Engineer's office. Such progress schedules are tentative and no guarantee is made that such work will be performed as indicated by the schedules.

10-1.08 EMISSIONS REDUCTION INCENTIVE PROGRAM

The Contractor shall participate in a program for the purpose of reducing emissions of nitrogen oxides (NOx) during the construction phase of this contract. Work performed under this program shall conform to these special provisions. Participating in this program shall not relieve the Contractor from the responsibility of conforming to the plans and specifications for this contract.

This program shall apply only to off-road, heavy-duty equipment powered by diesel engines with a rating between 50 and 750 horsepower. The Contractor shall receive an incentive payment for achieving a reduction in emissions as specified herein.

The Contractor shall provide for a reduction in NOx emissions to receive an incentive payment, by one of the following methods:

1. More than 20 percent of the off-road, heavy-duty diesel equipment used during construction of the project shall be controlled equipment, based on fuel consumption.
2. NOx emissions produced by off-road, heavy-duty diesel equipment during construction of the project shall be reduced to a NOx emission level less than that of a fleet utilizing 20 percent controlled equipment.

Off-road, heavy-duty diesel equipment is defined as any self-propelled vehicle used for construction purposes, using diesel fuel, having a manufacturer's maximum gross vehicle weight rating of 6,000 pounds or more, with a power rating between 50 and 750 horsepower, and moves only occasionally over highways, or which because of length, height, width, or weight, may not move over the public highways unladen without a permit conforming to the requirements of the California Vehicle Code.

Controlled equipment is defined as equipment powered by a California Air Resources Board certified off-road diesel engine. Certification shall be considered to mean the engine has a label attached in conformance to the requirements of the California Code of Regulations, Title 13.

At least 10 days prior to starting work, the Contractor shall submit a Construction Equipment Emission Plan (CEEP) to the Engineer. The plan will indicate the method used to achieve the emission reduction. If method 2 as specified above, is selected, the Contractor shall describe in the plan how the emissions reduction will be determined. The Engineer will review and approve, or return the plan to the Contractor for additional information within 10 days of receiving the plan. The Contractor shall re-submit the plan within 7 days after receiving the Engineer's request for additional information. With the Engineer's written approval, the Contractor may start work during the re-submittal period. Data sheets shall be maintained and submitted as specified herein if work begins before the CEEP has been approved.

The CEEP shall include data sheets that will be submitted to the Engineer biweekly, signed by an authorized representative of the Contractor. The data sheets shall be maintained on a daily basis and include the following information for all off-road, heavy-duty diesel equipment used:

1. Equipment identifying number conforming to the provisions in Section 5-1.10, "Equipment and Plants," of the Standard Specifications
2. Equipment make and model
3. Engine type and year
4. Engine power rating
5. Engine modifications
6. Hours of operation
7. Fuel usage
8. A signed statement containing the following language:

The undersigned,

_____ Name	_____ Date
_____ Title	

hereby certifies that the information provided herein is true and correct.

The Engineer will review the CEEP and make an initial determination whether the Contractor will meet or exceed the 20 percent controlled equipment utilization. If the Engineer's initial determination concludes the Contractor will meet or exceed the 20 percent controlled equipment utilization or equivalent, the Engineer will release 50 percent of the maximum possible incentive calculated for the contract with the first progress payment after approval of the CEEP, conforming to the provisions in Section 9-1.06, "Partial Payments," of the Standard Specifications.

The total amount of payment due the Contractor under this incentive program will be based on the percent of emissions reduction attained, and will be determined as a percentage of the total contract value based on the following equation:

$$X=(A-0.2)B/40$$

where:

- X = incentive payment due the Contractor
A = percent emission reduction or percent controlled vehicles used, based on time of use and amount of fuel used for off-road, heavy-duty diesel equipment (expressed as a decimal)
B = total contract value including extra work, not including incentive payment for emissions reduction.

If $A < 0.20$, then $X = 0$.

The total payment for emission reduction incentive program shall not exceed \$250,000.

At completion of the contract, the information collected in the data sheets submitted by the Contractor will be evaluated and used to make a final determination whether the Contractor has met or exceeded the 20 percent emissions reduction. Based on this evaluation, adjustments to the calculated incentive payment will be made. The final incentive amount, less the initial payment made upon approval of the CEEP, will be paid upon completion of this final determination.

Based on the final determination of percent emission reduction, any excess payment previously made for emission reduction incentive program to the Contractor will be deducted from moneys due or to become due the Contractor.

10-1.09 PROGRESS SCHEDULE (CRITICAL PATH METHOD)

The Contractor shall submit to the Engineer practicable critical path method (CPM) progress schedules in conformance with these special provisions. Whenever the term "schedule" is used in this section it shall mean CPM progress schedule.

Attention is directed to "Payments" of Section 5 of these special provisions.

The provisions in Section 8-1.04, "Progress Schedule," of the Standard Specifications shall not apply.

DEFINITIONS

The following definitions shall apply to this section:

- A. **ACTIVITY.**—A task, event or other project element on a schedule that contributes to completing the project. Activities have a description, start date, finish date, duration and one or more logic ties.
- B. **BASELINE SCHEDULE.**—The initial schedule representing the Contractor's work plan on the first working day of the project.
- C. **CONTRACT COMPLETION DATE.**—The current extended date for completion of the contract shown on the weekly statement of working days furnished by the Engineer in conformance with the provisions in Section 8-1.06, "Time of Completion," of the Standard Specifications.
- D. **CRITICAL PATH.**—The longest continuous chain of activities for the project that has the least amount of total float of all chains. In general, a delay on the critical path will extend the scheduled completion date.
- E. **CRITICAL PATH METHOD (CPM).**—A network based planning technique using activity durations and the relationships between activities to mathematically calculate a schedule for the entire project.
- F. **DATA DATE.**—The day after the date through which a schedule is current. Everything occurring earlier than the data date is "as-built" and everything on or after the data date is "planned."
- G. **EARLY COMPLETION TIME.**—The difference in time between an early scheduled completion date and the contract completion date.
- H. **FLOAT.**—The difference between the earliest and latest allowable start or finish times for an activity.
- I. **MILESTONE.**—An event activity that has zero duration and is typically used to represent the beginning or end of a certain stage of the project.
- J. **NARRATIVE REPORT.**—A document submitted with each schedule that discusses topics related to project progress and scheduling.
- K. **NEAR CRITICAL PATH.**—A chain of activities with total float exceeding that of the critical path but having no more than 10 working days of total float.
- L. **SCHEDULED COMPLETION DATE.**—The planned project finish date shown on the current accepted schedule.
- M. **STATE OWNED FLOAT ACTIVITY.**—The activity documenting time saved on the critical path by actions of the State. It is the last activity prior to the scheduled completion date.
- N. **TIME IMPACT ANALYSIS.**—A schedule and narrative report developed specifically to demonstrate what effect a proposed change or delay has on the current scheduled completion date.
- O. **TOTAL FLOAT.**—The amount of time that an activity or chain of activities can be delayed before extending the scheduled completion date.
- P. **UPDATE SCHEDULE.**—A current schedule developed from the baseline or subsequent schedule through regular monthly review to incorporate as-built progress and any planned changes.

GENERAL REQUIREMENTS

The Contractor shall submit to the Engineer baseline, monthly update and final update schedules, each consistent in all respects with the time and order of work requirements of the contract. The project work shall be executed in the sequence indicated on the current accepted schedule.

Schedules shall show the order in which the Contractor proposes to carry out the work with logical links between time-scaled work activities, and calculations made using the critical path method to determine the controlling operation or operations. The Contractor is responsible for assuring that all activity sequences are logical and that each schedule shows a coordinated plan for complete performance of the work.

The Contractor shall produce schedules using computer software and shall furnish compatible software for the Engineer's exclusive possession and use. The Contractor shall furnish network diagrams, narrative reports, tabular reports and schedule data as parts of each schedule submittal.

Schedules shall include, but not be limited to, activities that show the following that are applicable to the project:

- A. Project characteristics, salient features, or interfaces, including those with outside entities, that could affect time of completion.
- B. Project start date, scheduled completion date and other milestones.
- C. Work performed by the Contractor, subcontractors and suppliers.
- D. Submittal development, delivery, review and approval, including those from the Contractor, subcontractors and suppliers.
- E. Procurement, delivery, installation and testing of materials, plants and equipment.
- F. Testing and settlement periods.
- G. Utility notification and relocation.
- H. Erection and removal of falsework and shoring.

- I. Major traffic stage switches.
- J. Finishing roadway and final cleanup.
- K. State-owned float as the predecessor activity to the scheduled completion date.

Schedules shall have not less than 50 and not more than 500 activities, unless otherwise authorized by the Engineer. The number of activities shall be sufficient to assure adequate planning of the project, to permit monitoring and evaluation of progress, and to do an analysis of time impacts.

Schedule activities shall include the following:

- A. A clear and legible description.
- B. Start and finish dates.
- C. A duration of not less than one working day, except for event activities, and not more than 20 working days, unless otherwise authorized by the Engineer.
- D. At least one predecessor and one successor activity, except for project start and finish milestones.
- E. Required constraints.
- F. Codes for responsibility, stage, work shifts, location and contract pay item numbers.

The Contractor may show early completion time on any schedule provided that the requirements of the contract are met. Early completion time shall be considered a resource for the exclusive use of the Contractor. The Contractor may increase early completion time by improving production, reallocating resources to be more efficient, performing sequential activities concurrently or by completing activities earlier than planned. The Contractor may also submit for approval a cost reduction incentive proposal in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications that will reduce time of construction.

The Contractor may show a scheduled completion date that is later than the contract completion date on an update schedule, after the baseline schedule is accepted. The Contractor shall provide an explanation for a late scheduled completion date in the narrative report that is included with the schedule.

State-owned float shall be considered a resource for the exclusive use of the State. The Engineer may accrue State-owned float by the early completion of review of any type of required submittal when it saves time on the critical path. The Contractor shall prepare a time impact analysis, when requested by the Engineer, to determine the effect of the action in conformance with the provisions in "Time Impact Analysis" specified herein. The Engineer will document State-owned float by directing the Contractor to update the State-owned float activity on the next update schedule. The Contractor shall include a log of the action on the State-owned float activity and include a discussion of the action in the narrative report. The Engineer may use State-owned float to mitigate past, present or future State delays by offsetting potential time extensions for contract change orders.

The Engineer may adjust contract working days for ordered changes that affect the scheduled completion date, in conformance with the provisions in Section 4-1.03, "Changes," of the Standard Specifications. The Contractor shall prepare a time impact analysis to determine the effect of the change in conformance with the provisions in "Time Impact Analysis" specified herein, and shall include the impacts acceptable to the Engineer in the next update schedule. Changes that do not affect the controlling operation on the critical path will not be considered as the basis for a time adjustment. Changes that do affect the controlling operation on the critical path will be considered by the Engineer in decreasing time or granting an extension of time for completion of the contract. Time extensions will only be granted if the total float is absorbed and the scheduled completion date is delayed one or more working days because of the ordered change.

The Engineer's review and acceptance of schedules shall not waive any contract requirements and shall not relieve the Contractor of any obligation thereunder or responsibility for submitting complete and accurate information. Schedules that are rejected shall be corrected by the Contractor and resubmitted to the Engineer within 5 working days of notification by the Engineer, at which time a new review period of one week will begin.

Errors or omissions on schedules shall not relieve the Contractor from finishing all work within the time limit specified for completion of the contract. If, after a schedule has been accepted by the Engineer, either the Contractor or the Engineer discover that any aspect of the schedule has an error or omission, it shall be corrected by the Contractor on the next update schedule.

COMPUTER SOFTWARE

The Contractor shall submit to the Engineer for approval a description of proposed software before delivery. The software shall be the current version of Primavera SureTrak Project Manager for Windows, or equal, and shall be compatible with Windows NT (version 4.0) operating system. If software other than SureTrak is proposed, it shall be capable of generating files that can be imported into SureTrak.

The Contractor shall furnish schedule software and all original software instruction manuals to the Engineer with submittal of the baseline schedule. The furnished schedule software shall become the property of the State and will not be

returned to the Contractor. The State will compensate the Contractor in conformance with the provisions in Section 4-1.03, "Extra Work," of the Standard Specifications for replacement of software which is damaged, lost or stolen after delivery to the Engineer.

The Contractor shall instruct the Engineer in the use of the software and provide software support until the contract is accepted. Within 20 working days of contract approval, the Contractor shall provide a commercial 8-hour training session for 2 Department employees in the use of the software at a location acceptable to the Engineer. It is recommended that the Contractor also send at least 2 employees to the same training session to facilitate development of similar knowledge and skills in the use of the software. If software other than SureTrak is furnished, then the training session shall be a total of 16-hours for each Department employee.

NETWORK DIAGRAMS, REPORTS AND DATA

The Contractor shall include the following for each schedule submittal:

- A. Two sets of originally plotted, time-scaled network diagrams.
- B. Two copies of a narrative report.
- C. Two copies of each of 3 sorts of the CPM software-generated tabular reports.
- D. One 1.44-megabyte 3.5 inch floppy diskette containing the schedule data.

The time-scaled network diagrams shall conform to the following:

- A. Show a continuous flow of information from left to right.
- B. Be based on early start and early finish dates of activities.
- C. Clearly show the primary paths of criticality using graphical presentation.
- D. Be prepared on E-size sheets, 34 inch x 44 inch.
- E. Include a title block and a timeline on each page.

The narrative report shall be organized in the following sequence with all applicable documents included:

- A. Contractor's transmittal letter.
- B. Work completed during the period.
- C. Identification of unusual conditions or restrictions regarding labor, equipment or material; including multiple shifts, 6-day work weeks, specified overtime or work at times other than regular days or hours.
- D. Description of the current critical path.
- E. Changes to the critical path and scheduled completion date since the last schedule submittal.
- F. Description of problem areas.
- G. Current and anticipated delays:
 - 1. Cause of delay.
 - 2. Impact of delay on other activities, milestones and completion dates.
 - 3. Corrective action and schedule adjustments to correct the delay.
- H. Pending items and status thereof:
 - 1. Permits
 - 2. Change orders
 - 3. Time adjustments
 - 4. Non-compliance notices
- I. Reasons for an early or late scheduled completion date in comparison to the contract completion date.

Tabular reports shall be software-generated and provide information for each activity included in the project schedule. Three different reports shall be sorted by (1) activity number, (2) early start and (3) total float. Tabular reports shall be 8 1/2 inch x 11 inch in size and shall include, as a minimum, the following applicable information:

- A. Data date
- B. Activity number and description
- C. Predecessor and successor activity numbers and descriptions
- D. Activity codes

- E. Scheduled, or actual and remaining durations (work days) for each activity
- F. Earliest start (calendar) date
- G. Earliest finish (calendar) date
- H. Actual start (calendar) date
- I. Actual finish (calendar) date
- J. Latest start (calendar) date
- K. Latest finish (calendar) date
- L. Free float (work days)
- M. Total float (work days)
- N. Percentage of activity complete and remaining duration for incomplete activities.
- O. Lags
- P. Required constraints

Schedule submittals will only be considered complete when all documents and data have been provided as described above.

PRE-CONSTRUCTION SCHEDULING CONFERENCE

The Contractor shall schedule and the Engineer will conduct a pre-construction scheduling conference with the Contractor's project manager and construction scheduler within 10 working days of the approval of the contract. At this meeting the Engineer will review the requirements of this section of the special provisions with the Contractor.

The Contractor shall submit a general time-scaled logic diagram displaying the major activities and sequence of planned operations and shall be prepared to discuss the proposed work plan and schedule methodology that comply with the requirements of these special provisions. If the Contractor proposes deviations to the construction staging of the project, then the general time-scaled logic diagram shall also display the deviations and resulting time impacts. The Contractor shall be prepared to discuss the proposal.

At this meeting, the Contractor shall additionally submit the alphanumeric coding structure and the activity identification system for labeling the work activities. To easily identify relationships, each activity description shall indicate its associated scope or location of work by including such terms as quantity of material, type of work, bridge number, station to station location, side of highway (such as left, right, northbound, southbound), lane number, shoulder, ramp name, ramp line descriptor or mainline.

The Engineer will review the logic diagram, coding structure, and activity identification system, and provide any required baseline schedule changes to the Contractor for implementation.

BASELINE SCHEDULE

Beginning the week following the pre-construction scheduling conference, the Contractor shall meet with the Engineer weekly until the baseline schedule is accepted by the Engineer to discuss schedule development and resolve schedule issues.

The Contractor shall submit to the Engineer a baseline schedule within 20 working days of approval of the contract. The Contractor shall allow 3 weeks for the Engineer's review after the baseline schedule and all support data are submitted. In addition, the baseline schedule submittal will not be considered complete until the computer software is delivered and installed for use in review of the schedule.

The baseline schedule shall include the entire scope of work and how the Contractor plans to complete all work contemplated. The baseline schedule shall show the activities that define the critical path. Multiple critical paths and near-critical paths shall be kept to a minimum. A total of not more than 50 percent of the baseline schedule activities shall be critical or near critical, unless otherwise authorized by the Engineer.

The baseline schedule shall not extend beyond the number of working days specified in these special provisions. The baseline schedule shall have a data date of the first working day of the contract and not include any completed work to date. The baseline schedule shall not attribute negative float or negative lag to any activity.

If the Contractor submits an early completion baseline schedule that shows contract completion in less than 85 percent of the working days specified in these special provisions, the baseline schedule shall be supplemented with resource allocations for every task activity and include time-scaled resource histograms. The resource allocations shall be shown to a level of detail that facilitates report generation based on labor crafts and equipment classes for the Contractor and subcontractors. The Contractor shall use average composite crews to display the labor loading of on-site construction activities. The Contractor shall optimize and level labor to reflect a reasonable plan for accomplishing the work of the contract and to assure that resources are not duplicated in concurrent activities. The time-scaled resource histograms shall show labor crafts and equipment classes to be utilized on the contract. The Engineer may review the baseline schedule activity resource allocations using Means Productivity Standards or equivalent to determine if the schedule is practicable.

UPDATE SCHEDULE

The Contractor shall submit an update schedule and meet with the Engineer to review contract progress, on or before the first day of each month, beginning one month after the baseline schedule is accepted. The Contractor shall allow 2 weeks for the Engineer's review after the update schedule and all support data are submitted, except that the review period shall not start until the previous month's required schedule is accepted. Update schedules that are not accepted or rejected within the review period will be considered accepted by the Engineer.

The update schedule shall have a data date of the twenty-first day of the month or other date established by the Engineer. The update schedule shall show the status of work actually completed to date and the work yet to be performed as planned. Actual activity start dates, percent complete and finish dates shall be shown as applicable. Durations for work that has been completed shall be shown on the update schedule as the work actually occurred, including Engineer submittal review and Contractor resubmittal times.

The Contractor may include modifications such as adding or deleting activities or changing activity constraints, durations or logic that do not (1) alter the critical path(s) or near critical path(s) or (2) extend the scheduled completion date compared to that shown on the current accepted schedule. The Contractor shall state in writing the reasons for any changes to planned work. If any proposed changes in planned work will result in (1) or (2) above, then the Contractor shall submit a time impact analysis as described herein.

TIME IMPACT ANALYSIS

The Contractor shall submit a written time impact analysis (TIA) to the Engineer with each request for adjustment of contract time, or when the Contractor or Engineer consider that an approved or anticipated change may impact the critical path or contract progress.

The TIA shall illustrate the impacts of each change or delay on the current scheduled completion date or internal milestone, as appropriate. The analysis shall use the accepted schedule that has a data date closest to and prior to the event. If the Engineer determines that the accepted schedule used does not appropriately represent the conditions prior to the event, the accepted schedule shall be updated to the day before the event being analyzed. The TIA shall include an impact schedule developed from incorporating the event into the accepted schedule by adding or deleting activities, or by changing durations or logic of existing activities. If the impact schedule shows that incorporating the event modifies the critical path and scheduled completion date of the accepted schedule, the difference between scheduled completion dates of the two schedules shall be equal to the adjustment of contract time. The Engineer may construct and utilize an appropriate project schedule or other recognized method to determine adjustments in contract time until the Contractor provides the TIA.

The Contractor shall submit a TIA in duplicate within 15 working days of receiving a written request for a TIA from the Engineer. The Contractor shall allow the Engineer 2 weeks after receipt to approve or reject the submitted TIA. All approved TIA schedule changes shall be shown on the next update schedule.

If a TIA submitted by the Contractor is rejected by the Engineer, the Contractor shall meet with the Engineer to discuss and resolve issues related to the TIA. If agreement is not reached, the Contractor will be allowed 15 days from the meeting with the Engineer to give notice in conformance with the provisions in Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications. The Contractor shall only show actual as-built work, not unapproved changes related to the TIA, in subsequent update schedules. If agreement is reached at a later date, approved TIA schedule changes shall be shown on the next update schedule. The Engineer will withhold remaining payment on the schedule contract item if a TIA is requested by the Engineer and not submitted by the Contractor within 15 working days. The schedule item payment will resume on the next estimate after the requested TIA is submitted. No other contract payment will be retained regarding TIA submittals.

FINAL UPDATE SCHEDULE

The Contractor shall submit a final update, as-built schedule with actual start and finish dates for the activities, within 30 days after completion of contract work. The Contractor shall provide a written certificate with this submittal signed by the Contractor's project manager and an officer of the company stating, "To my knowledge and belief, the enclosed final update schedule reflects the actual start and finish dates of the actual activities for the project contained herein." An officer of the company may delegate in writing the authority to sign the certificate to a responsible manager.

RETENTION

The Department will retain an amount equal to 25 percent of the estimated value of the work performed during each estimate period in which the Contractor fails to submit an acceptable schedule conforming to the requirements of these special provisions as determined by the Engineer. Schedule retentions will be released for payment on the next monthly estimate for partial payment following the date that acceptable schedules are submitted to the Engineer or as otherwise specified herein. Upon completion of all contract work and submittal of the final update schedule and certification, any remaining retained funds associated with this section, "Progress Schedule (Critical Path Method)", will be released for payment. Retentions held in conformance with this section shall be in addition to other retentions provided for in the contract. No interest will be due the Contractor on retention amounts.

PAYMENT

Progress schedule (critical path method) will be paid for at a lump sum price. The contract lump sum price paid for progress schedule (critical path method) shall include full compensation for furnishing all labor, material, tools, equipment, and incidentals, including computer software, and for doing all the work involved in preparing, furnishing, and updating schedules, and instructing and assisting the Engineer in the use of computer software, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Payments for the progress schedule (critical path method) contract item will be made progressively as follows:

- A. A total of 25 percent of the item amount or a total of 25 percent of the amount listed for progress schedule (critical path method) in "Payments" of Section 5 of these special provisions, whichever is less, will be paid upon achieving all of the following:
 - 1. Completion of 5 percent of all contract item work.
 - 2. Acceptance of all schedules and TIAs required to the time when 5 percent of all contract item work is complete.
 - 3. Delivery of schedule software to the Engineer.
 - 4. Completion of required schedule software training.
- B. A total of 50 percent of the item amount or a total of 50 percent of the amount listed for progress schedule (critical path method) in "Payments" of Section 5 of these special provisions, whichever is less, will be paid upon completion of 25 percent of all contract item work and acceptance of all schedules and TIAs required to the time when 25 percent of all contract item work is complete.
- C. A total of 75 percent of the item amount or a total of 75 percent of the amount listed for progress schedule (critical path method) in "Payments" of Section 5 of these special provisions, whichever is less, will be paid upon completion of 50 percent of all contract item work and acceptance of all schedules and TIAs required to the time when 50 percent of all contract item work is complete.
- D. A total of 100 percent of the item amount or a total of 100 percent of the amount listed for progress schedule (critical path method) in "Payments" of Section 5 of these special provisions, whichever is less, will be paid upon completion of all contract item work, acceptance of all schedules and TIAs required to the time when all contract item work is complete, and submittal of the certified final update schedule.

If the Contractor fails to complete any of the work or provide any of the schedules required by this section, the Engineer shall make an adjustment in compensation in conformance with the provisions in Section 4-1.03C, "Changes in Character of Work," of the Standard Specifications for the work not performed. Adjustments in compensation for schedules will not be made for any increased or decreased work ordered by the Engineer in furnishing schedules.

10-1.10 OVERHEAD

Overhead shall conform to these special provisions. The Contractor will be compensated for time-related overhead in conformance with these special provisions.

Attention is directed to "Force Account Payment" and "Progress Schedule (Critical Path Method)" of these special provisions.

The provisions in Section 9-1.08, "Adjustment of Overhead Costs," of the Standard Specifications shall not apply.

Time-related overhead shall consist of those overhead costs, including field and home office overhead, that are in proportion to the time required to complete the work. Time-related overhead shall not include costs that are not related to time, including but not limited to, mobilization, licenses, permits, and any other charges incurred only once during the contract.

Field office overhead expenses include time-related costs associated with the normal and recurring operations of the construction project, and shall not include costs directly attributable to any of the work of the contract. Such time-related costs include, but are not limited to, the salaries and benefits of project managers, general superintendents, field office managers and other field office staff assigned to the project, and rent, utilities, maintenance, security, supplies and equipment costs of the project field office.

Home office overhead or general and administrative expenses refer to the fixed costs of operating the Contractor's business. These costs include, but are not limited to, general administration, insurance, personnel and subcontract administration, purchasing, accounting, and project engineering and estimating. The rate of home office overhead shall exclude expenses specifically related to other contracts or other businesses of the Contractor, equipment coordination, material deliveries, and consultant and legal fees.

The quantity of time-related overhead to be paid will be measured by the working day, as specified in the Engineer's Estimate as WDAY. The estimated amount will be based on the number of working days, excluding any days for plant establishment, as specified in "Beginning of Work, Time of Completion and Liquidated Damages" of these special provisions. In the event an early completion progress schedule, as defined in "Progress Schedule (Critical Path Method)" of these special provisions, is submitted by the Contractor and approved by the Engineer, the quantity of time-related overhead eligible for payment will be based on the total number of working days as specified in "Beginning of Work, Time of Completion and Liquidated Damages" of these special provisions, rather than the Contractor's early completion progress schedule. The quantity of time-related overhead, as measured above, will be adjusted only as a result of suspensions and adjustments of time which revise the current contract completion date and which are also any of the following:

- A. Suspensions of work ordered in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications, except:
 - 1. Suspensions ordered due to weather conditions being unfavorable for the suitable prosecution of the controlling operation or operations; or
 - 2. Suspensions ordered due to the failure on the part of the Contractor to carry out orders given, or to perform any provision of the contract; or
 - 3. Any other suspensions mutually agreed upon between the Engineer and the Contractor.
- B. Extensions of time granted by the State in conformance with the provisions in the fifth paragraph in Section 8-1.07, "Liquidated Damages," of the Standard Specifications; or
- C. Reductions in contract time set forth in approved contract change orders, in conformance with the provisions in Section 4-1.03, "Changes," of the Standard Specifications.

In the event a cost reduction proposal is submitted by the Contractor, and is subsequently approved by the Engineer, which provides for a reduction in contract time, the contract amount of time-related overhead associated with the reduction in contract time shall be considered as a net savings in the total cost of time-related overhead. The Contractor will be paid 50 percent of the estimated net savings of the time-related overhead, in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications.

If the quantity of time-related overhead, measured as specified in this special provision, exceeds 149 percent of the number of working days specified in the Engineer's Estimate, the Contractor shall, within 60 days of the Engineer's written request, submit to the Engineer an audit examination and report performed by an independent Certified Public Accountant of the Contractor's actual overhead costs. The independent Certified Public Accountant's audit examination shall be performed in conformance with the requirements of the American Institute of Certified Public Accountants Attestation Standards. The audit examination and report shall depict the Contractor's project and company-wide financial records and shall specify the actual overall average daily rates for both field and home office overhead for the entire duration of the project, and whether the costs have been properly allocated. The rates of field and home office overhead shall exclude all unallowable costs as determined in the Federal Acquisition Regulations, 48 CFR, Chapter 1, Part 31. The audit examination shall determine if the rates of field and home office overhead:

- A. are allowable in conformance with the requirements of the Federal Acquisition Regulations, 48 CFR, Chapter 1, Part 31;
- B. are adequately supported by reliable documentation; and
- C. related solely to the project under examination.

Upon the Engineer's written request, the Contractor shall make its financial records available for audit by the State for the purpose of verifying the actual rate of time-related overhead specified in the audit submitted by the Contractor. The actual rate of time-related overhead specified in the audit, submitted by the Contractor, will be subject to approval by the Engineer.

If the Engineer elects, or if requested in writing by the Contractor, contract item payments for time-related overhead, in excess of 149 percent of the number of working days designated in the Engineer's Estimate, will be adjusted to reflect the actual rate.

The cost of performing an audit examination and submitting the report, requested by the Engineer, will be borne equally by the State and the Contractor. The division of the cost will be made by determining the cost of providing an audit examination in conformance with the provisions of Section 9-1.03B, "Work performed by Special Forces or Other Special Services" of the Standard Specifications, and paying to the Contractor one-half of that cost.

The contract price paid per working day for time-related overhead shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in time-related overhead, complete in place, including all field and home office overhead costs incurred by the Contractor and by any joint venture partner, subcontractor, supplier or other party associated with the Contractor, and the Contractor's share of costs of audits of overhead costs requested by the Engineer, as specified in these special provisions, and as directed by the Engineer. The provisions in Sections 4-1.03B, "Increased or Decreased Quantities," 4-1.03C, "Changes in Character of the Work," of the Standard Specifications shall not apply to time-related overhead.

Full compensation for additional overhead costs involved in the performance of extra work at force account shall be considered as included in the markups specified in "Force Account Payment," of these special provisions.

Full compensation for additional overhead cost involved in performing additional contract item work that is not a controlling operation and for all overhead, other than the time-related overhead measured and paid for as specified in this section "Overhead", shall be considered as included in the various items of work involved, and no additional compensation will be allowed therefor.

For the purpose of making partial payments pursuant to the provisions in Section 9-1.06, "Partial Payments," of the Standard Specifications, the number of working days to be paid for time-related overhead in each monthly partial payment will be the number of working days, specified above to be measured for payment, that occurred during that monthly estimate period. The amount earned per working day for time-related overhead shall be either the contract item price, or 20 percent of the original total contract amount divided by the number of working days specified in "Beginning of Work, Time of Completion and Liquidated Damages," of these special provisions, whichever is the lesser.

After all work has been completed, except plant establishment work, as provided in Section 20-4.08, "Plant Establishment Work," of the Standard Specifications, the amount, if any, of the total contract item price for time-related overhead not yet paid will be included for payment in the first estimate made after completion of all roadway construction work, in conformance with the provisions in Section 9-1.06, "Partial Payments," of the Standard Specifications.

10-1.11 OBSTRUCTIONS

Attention is directed to Sections 8-1.10, "Utility and Non-Highway Facilities," Section 15, "Existing Highway Facilities," and Section 51-1.19, "Utility Facilities," of the Standard Specifications and these special provisions.

Attention is directed to the existence of certain underground facilities that may require special precautions be taken by the Contractor to protect the health, safety and welfare of workers and of the public. Facilities requiring special precautions include, but are not limited to: conductors of petroleum products, oxygen, chlorine, and toxic or flammable gases; natural gas in pipelines greater than 6 inches in diameter or pipelines operating at pressures greater than 60 psi gauge; underground electric supply system conductors or cables, with potential to ground of more than 300 volts, either directly buried or in a duct or conduit which do not have concentric grounded or other effectively grounded metal shields or sheaths.

If such facilities are not located on the plans in both alignment and elevation, no work shall be performed in the vicinity of said facilities, except as provided herein for conduit to be placed under pavement, until the owner, or his representative, has located the facility by potholing, probing, or other means that will locate and identify the facility. Any conduit to be installed under pavement in the vicinity of such facilities shall be placed by the "Trenching in Pavement Method" in conformance with the provisions in Section entitled "Conduit" elsewhere in these special provisions. If, in the opinion of the Engineer, the Contractor's operations are delayed or interfered with by reason of the utility facilities not being located by the owner or his representative, the State will compensate the Contractor for such delays to the extent provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications, and not otherwise, except as provided in Section 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications.

Excavation required to install electrical conduits and pull boxes in the areas with high risk utilities shall be performed by hand excavation without the use of power equipment except that power equipment may be used to cut and remove asphalt or Portland cement pavement.

The Contractor shall notify the Engineer and the appropriate regional notification center for operators of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include, but are not limited to, the following:

Notification Center	Telephone Number
Underground Service Alert-Northern California (USA)	1-800-642-2444 1-800-227-2600
Underground Service Alert-Southern California (USA)	1-800-422-4133 1-800-227-2600

The Contractor shall notify the Engineer and contact Metropolitan Water District of Southern California (MWD) Operations Maintenance Branch, Telephone No. (213) 217-7723, to arrange field-marking of the centerline of the MWD pipe in Durfee Avenue.

The Contractor shall submit to the Engineer and MWD for review and approval, a list of equipment, complete with their specifications, which will be used in the vicinity of the MWD pipeline at least 2 weeks prior to their use. The Contractor shall notify MWD's Operations Maintenance Branch at least 2 working days prior to starting any work in the vicinity of MWD facilities.

The Contractor shall notify the Southern California Gas Company representative a minimum of 2 weeks before excavation begins at Abutment 1 of Santa Anita Avenue Undercrossing (Widen). The 20-inch steel gas line located within the vicinity of Abutment 1 of Santa Anita Avenue Undercrossing (Widen) shall be protected in place.

The Contractor shall notify Service Authority for Freeway Emergencies (SAFE), Telephone No. (213) 922-6021, 2 weeks prior to removing call boxes. The Contractor shall notify SAFE at the completion of construction to replace the call boxes.

The Contractor shall notify Sprint at Telephone No. (714) 781-7053 prior to construction affecting the Sprint line located within railroad right of way (Thomas Guide LA 637 E-1) for protection of fiber optic cables.

The following utility facilities will be relocated during the progress of the contract. The Contractor shall notify the Engineer, in writing, prior to doing any work in the vicinity of the facility. The utility facility will be relocated within the listed working days, as defined in Section 8-1.06, "Time of Completion," of the Standard Specifications, after the notification is received by the Engineer.

Utility	Location	Working Days
Power pole and Overhead Electric Cables (Southern California Edison)	Asher Street, Station 16+90, Right	150
3 (4-inch diameter) underground conduits (Pacific Bell Telephone)	Peck Road, 90+60 to 93+75, Right	150
6-inch Cast iron Water Main (San Gabriel Valley Water)	Valley Boulevard, Station 9+50 to 13+00, Right	150
Underground Conduits (Pacific Bell Telephone)	Valley Boulevard, Station 9+50 to 13+00, Right	150
Underground Conduits (Southern California Edison)	Valley Boulevard, Station 9+50 to 13+00, Right	150
Underground Fiber Optic and Copper Signal Cable (Southern California Regional Rail Authority)	'D' Line Station 548+00± Left to Station 558+00± Right	150
Underground Telephone Cable (Williams Communications)	'D' Line Station 548+00± Left to Station 558+00± Right	150
Underground Fiber Optic (US Sprint)	'D' Line Station 548+00± Left to Station 558+00± Right	150
Overhead Electric Cable (Union Pacific Railroad)	'D' Line Station 548+00± Left to Station 558+00± Right	150

In the event that the utility facilities mentioned above are not removed or relocated by the date specified and, if in the opinion of the Engineer, the Contractor's operations are delayed or interfered with by reason of the utility facilities not being removed or relocated by the date specified, the State will compensate the Contractor for such delays to the extent provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications, and not otherwise, except as provided in Section 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications.

Construction of the railroad shoofly tracks shall require coordination with the Contractor's operations. The Contractor shall make the necessary arrangements with the Railroad company, through the Engineer, and shall submit a schedule of work, verified by a representative of the Railroad company, to the Engineer. The schedule of work shall provide not less than the following number of working days, as defined in Section 8-1.06, "Time of Completion," of the Standard Specifications for the Railroad company to complete their work:

Railroad Operator	Location	Working Days
Union Pacific Railroad (UPRR)	From 860' west of El Monte Overhead to 1,135' east of El Monte Overhead	240
Southern California Regional Rail Authority (Metrolink)	From 690' west of El Monte Overhead to 1,305' east of El Monte Overhead	240

10-1.12 DUST CONTROL

Dust control shall conform to the provisions in Section 10, "Dust Control," of the Standard Specifications and these special provisions.

The Contractor shall limit vehicle and construction equipment speeds on unpaved roads and other unpaved areas to 25 miles per hour.

The Contractor shall operate street sweepers on local roads used for construction related activities.

Trucks hauling dirt or gravel required for construction activities, which enter or leave the project limits shall maintain a minimum freeboard of 2 feet.

Construction activities shall be stopped during Stage 2 smog episodes.

Construction equipment shall be kept properly tuned and in good working order.

Grading activities shall be staged, whenever possible, to minimize daily emissions.

Low sulfur fuel shall be used for construction equipment when possible.

The Contractor shall remove accumulations of dried soil from construction equipment and trucks entering and leaving the project limits on roads open to public traffic on a daily basis.

10-1.13 MOBILIZATION

Mobilization shall conform to the provisions in Section 11, "Mobilization," of the Standard Specifications.

10-1.14 CONSTRUCTION AREA TRAFFIC CONTROL DEVICES

Flagging, signs, and all other traffic control devices furnished, installed, maintained, and removed when no longer required shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Category 1 traffic control devices are defined as those devices that are small and lightweight (less than 99 lb), and have been in common use for many years. The devices shall be known to be crashworthy by crash testing, crash testing of similar devices, or years of demonstrable safe performance. Category 1 traffic control devices include traffic cones, plastic drums, portable delineators, and channelizers.

If requested by the Engineer, the Contractor shall provide written self-certification for crashworthiness of Category 1 traffic control devices. Self-certification shall be provided by the manufacturer or Contractor and shall include the following: date, Federal Aid number (if applicable), expenditure authorization, district, county, route and kilometer post of project limits; company name of certifying vendor, street address, city, state and zip code; printed name, signature and title of certifying person; and an indication of which Category 1 traffic control devices will be used on the project. The Contractor may obtain a standard form for self-certification from the Engineer.

Category 2 traffic control devices are defined as those items that are small and lightweight (less than 99 lb), that are not expected to produce significant vehicular velocity change, but may otherwise be potentially hazardous. Category 2 traffic control devices include: barricades and portable sign supports.

Category 2 devices purchased on or after October 1, 2000 shall be on the Federal Highway Administration (FHWA) Acceptable Crashworthy Category 2 Hardware for Work Zones list. This list is maintained by FHWA and can be located at the following internet address: <http://safety.fhwa.dot.gov/fourthlevel/hardware/listing.cfm?code=workzone>. The Department maintains a secondary list at the following internet address: <http://www.dot.ca.gov/hq/traffops/signtech/signdel/pdf/FILES.htm>.

Category 2 devices that have not received FHWA acceptance, and were purchased before October 1, 2000, may continue to be used until they complete their useful service life or until January 1, 2003, whichever comes first. Category 2 devices in use that have received FHWA acceptance shall be labeled with the FHWA acceptance letter number and the name of the manufacturer by the start of the project. The label shall be readable. After January 1, 2003, all Category 2 devices without a label shall not be used on the project.

If requested by the Engineer, the Contractor shall provide a written list of Category 2 devices to be used on the project at least 5 days prior to beginning any work using the devices. For each type of device, the list shall indicate the FHWA acceptance letter number and the name of the manufacturer.

Full compensation for providing self-certification for crashworthiness of Category 1 traffic control devices and for providing a list of Category 2 devices used on the project and labeling Category 2 devices as specified shall be considered as included in the prices paid for the various contract items of work requiring the use of the Category 1 or Category 2 traffic control devices and no additional compensation will be allowed therefor.

10-1.15 CONSTRUCTION AREA SIGNS

Construction area signs shall be furnished, installed, maintained, and removed when no longer required in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Attention is directed to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. Type II retroreflective sheeting shall not be used on construction area sign panels.

Attention is directed to "Construction Project Information Signs" of these special provisions regarding the number and type of construction project information signs to be furnished, erected, maintained, and removed and disposed of.

The Contractor shall notify the appropriate regional notification center for operators of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to commencing excavation for construction area sign posts. The regional notification centers include but are not limited to the following:

Notification Center	Telephone Number
Underground Service Alert-Northern California (USA)	1-800-642-2444 1-800-227-2600
Underground Service Alert-Southern California (USA)	1-800-422-4133 1-800-227-2600

Delete the second paragraph in Section 12-2.02, "Flagging Costs," of the Standard Specifications.

The provisions in this Section 12-2.02 shall in no way relieve the Contractor from the responsibility of providing for the safety of the public as provided in Section 7-1.09 nor relieve the Contractor from the responsibility for damage as provided in Section 7, "Legal Relations and Responsibility."

Add the following paragraph to Section 12-3.01, "General," of the Standard Specifications:

Retroreflective sheeting shall conform to the requirements in ASTM Designation: D 4956-95 and to the special provisions.

The table in Section 12-3.03, "Flashing Arrow Signs," of the Standard Specifications is amended to read:

Type	Min. Size	Min. Number of Panel Lights	Min. Legibility Distance
I	47 1/4" x 94 1/2"	15	1 mile
II	35 1/2" x 71"	13	3/4-mile

Excavations required to install construction area signs shall be performed by hand methods without the use of power equipment, except that power equipment may be used if it is determined there are no utility facilities in the area of the proposed post holes.

Sign substrates for stationary mounted construction area signs may be fabricated from fiberglass reinforced plastic as specified under "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

The height to the bottom of stationary mounted sign panels above the edge of traveled way shall be at least 7 feet.

Delete the third paragraph of Section 12-3.06A, "Stationary Mounted Signs," of the Standard Specifications.

Sign panels for stationary mounted signs shall consist of Type III or Type IV retroreflective sheeting applied to an aluminum substrate conforming to the requirements in the Department's "Specifications for Reflective Sheeting Aluminum Signs." The type of retroreflective sheeting, Type III or Type IV, shall be at the Contractor's option and sign substrates fabricated from materials other than aluminum may be used as specified in these special provisions.

Legend and border may be applied by a screening process or by use of pressure sensitive cut-out sheeting. Size and spacing of letters and symbols shall be as depicted on the sign specification sheets published by the Department.

Rectangular signs over 55 inches measured along the horizontal axis, and diamond-shaped signs 60 inches and larger shall be framed unless otherwise specified. Frames shall be constructed in conformance with the requirements in the Department's "Framing Details for Sheet Aluminum Signs," Sheets 1 through 4 and Table 1 on Sheet 5.

Copies of the Department's "Specifications for Reflective Sheeting Aluminum Signs," "Framing Details for Sheet Aluminum Signs," and sign specification sheets may be obtained from the Department's Office of Business Management, Materiel Operations Branch, 1900 Royal Oaks Drive, Sacramento, CA 95815.

Delete the second, third, and fourth paragraphs of Section 12-3.06B, "Portable Signs," of the Standard Specifications.

Sign panels for portable signs shall conform to the provisions for sign panels for stationary mounted signs in Section 12-3.06A, "Stationary Mounted Signs," of the Standard Specifications or shall be Type VI retroreflective sheeting, or shall be cotton drill fabric, flexible industrial nylon fabric or other approved fabric. Fabric signs shall not be used during the hours of darkness. Size, color and legend requirements for portable signs shall be described for stationary mounted sign panels in Section 12-3.06A of the Standard Specifications. The height to the bottom of the sign panel above the edge of traveled way shall be at least one foot.

The term "construction area signs" shall also include temporary object markers and temporary roadside signs required for the direction, regulation and advisory of public traffic through or around the work during construction. Object markers and temporary roadside signs listed or designated on the plans as construction area signs shall be considered to be signs and shall be furnished, erected, maintained, and removed by the Contractor in the same manner specified for construction area signs and the following:

Object markers shall be stationary mounted on wood or metal posts in accordance with the details shown on the plans and the requirements in Section 82, "Markers and Delineators," of the Standard Specifications.

Temporary roadside signs shall be stationary mounted on wood posts in accordance with the details shown on the plans and the requirements in Section 56-2, "Roadside Signs," of the Standard Specifications.

Marker panels for Type N, Type N-4, Type P, and Type R object markers shall conform to the requirements for sign panels for stationary mounted signs.

10-1.16 MAINTAINING TRAFFIC

Attention is directed to Sections 7-1.08, "Public Convenience," 7-1.09, "Public Safety," and 12, "Construction Area Traffic Control Devices," of the Standard Specifications and to the provisions in "Portable Changeable Message Signs," "Public Safety," and "Temporary Traffic Screen" of these special provisions, and these special provisions. Nothing in these special provisions shall be construed as relieving the Contractor from the responsibilities specified in Section 7-1.09.

The minimum size specified for Type II flashing arrow signs in the table following the second paragraph of Section 12-3.03, "Flashing Arrow Signs," of the Standard Specifications is amended to read "36 inches by 72 inches".

The second and third paragraphs of Section 12-3.10, "Traffic Cones," of the Standard Specifications are amended to read:

During the hours of darkness, traffic cones shall be affixed with retroreflective cone sleeves. The retroreflective sheeting of sleeves on the traffic cones shall be visible at 1,000 feet at night under illumination of legal high beam headlights, by persons with vision of or corrected to 20/20.

Retroreflective cone sleeves shall conform to one of the following:

1. Removable flexible retroreflective cone sleeves shall be fabricated from the retroreflective sheeting specified in the special provisions, have a minimum height of 13 inches and shall be placed a maximum of 3 inches from the top of the cone. The sleeves shall not be in place during daylight hours.
2. Permanently affixed semitransparent retroreflective cone sleeves shall be fabricated from the semitransparent retroreflective sheeting specified in the special provisions, have a minimum height of 13 inches, and shall be placed a maximum of 3 inches from the top of the cone. Traffic cones with semitransparent retroreflective cone sleeves may be used during daylight hours, or:
3. Permanently affixed double band retroreflective cone sleeves shall have 2 white retroreflective bands. The top band shall be 6 inches in height, placed a maximum of 4 inches from the top of the cone. The lower band shall be 4 inches in height, placed 2 inches below the bottom of the top band. Traffic cones with double band retroreflective cone sleeves may be used during daylight hours.

The type of retroreflective cone sleeve used shall be at the option of the Contractor. Only one type of retroreflective cone sleeve shall be used on the project.

Lane closures shall conform to the provisions in the section of these special provisions entitled "Traffic Control System for Lane Closure."

In addition to the provisions set forth in "Public Safety", of these special provisions, whenever work to be performed on the freeway traveled way (except for grinding operations, saw cutting and installing loop detectors provided a truck mounted attenuator (TMA) is utilized as a shadow vehicle at the Contractor's expense, and except the work of installing, maintaining, and removing traffic control devices) is within 6 feet of the adjacent traffic lane, the adjacent traffic lane shall be closed.

At locations where falsework pavement lighting or pedestrian openings through falsework are designated, falsework lighting shall be installed in conformance with the provisions in Section 86-6.11, "Falsework Lighting," of the Standard Specifications.

Attention is directed to Section 13, "Relations With The Railroad" regarding railroad horizontal clearances and openings through falsework.

Openings shall be provided through bridge falsework for the use of public traffic at each location where falsework is constructed over the streets or routes listed in the following table. The type, minimum width, height, and number of openings at each location, and the location and maximum spacing of falsework lighting, if required for each opening, shall conform to the requirements in the table. The width of vehicular openings shall be the clear width between temporary railings or other protective work. The spacing shown for falsework pavement lighting is the maximum distance center to center in feet between fixtures.

Rio Hondo Bridge (Widen)			
Br. No. 53-0657			
	Number	Width	Height
Vehicle Openings	1	20'	11' - 6"
Equestrian Opening	1	10'	10'
Location and Spacing of Falsework Pavement Lighting			
Vehicle Opening R 22.5			
Equestrian Opening C 22.5			

Tyler Avenue UC (Widen)			
Br. No. 53-0659			
	Number	Width	Height
Vehicle Openings	2	20'	14'
Pedestrian Openings	2	8'	10'
Location and Spacing of Falsework Pavement Lighting			
Vehicle Openings R 22.5			
Pedestrian Openings C 22.5			

Durfee Avenue UC (Widen) Br. No. 53-1031			
	Number	Width	Height
Vehicle Openings	2	20'	14'
Pedestrian Openings	2	8'	10'
Location and Spacing of Falsework Pavement Lighting			
Vehicle Openings R 22.5			
Pedestrian Openings C 22.5			

San Gabriel River Bridge (Widen) Br. No. 53-0109			
	Number	Width	Height
Vehicle Openings (East Side of River)	1	20'	10'
Vehicle Openings (West Side of River)	1	10'	9'
Location and Spacing of Falsework Pavement Lighting			
Vehicle Opening C 22.5			
Pedestrian Opening C 22.5			

Garvey Avenue Off-Ramp Undercrossing (Widen) Br. No. 53-1032			
	Number	Width	Height
Vehicle Openings	1	20'	15'
Location and Spacing of Falsework Pavement Lighting			
Vehicle Openings C 22.5			

Meeker Road Undercrossing (Widen) Br. No. 53-1029			
	Number	Width	Height
Vehicle Openings	---	---	---
Pedestrian Openings	1	8'	10'
Location and Spacing of Falsework Pavement Lighting			
Pedestrian Opening C 22.5			

(Width and Height in feet.)

(R=right side of traffic. L=left side of traffic)

(C=Centered overhead.)

The exact location of openings will be determined by the Engineer.

Personal vehicles of the Contractor's employees shall not be parked within the freeway right of way.

The Contractor shall notify local authorities of the Contractor's intent to begin work at least 5 days before work is begun. The Contractor shall cooperate with local authorities relative to handling traffic through the area and shall make arrangements relative to keeping the working area clear of parked vehicles.

Whenever vehicles or equipment are parked on the freeway shoulder within 6 feet of a traffic lane, the shoulder area shall be closed as shown on the plans.

Except as otherwise provided in these special provisions, freeway lanes and connectors shall be closed only during the hours shown on Charts 1, 2, 8 and 9 included in this section "Maintaining Traffic." Except work required under said Sections 7-1.08 and 7-1.09, work that interferes with public traffic shall be performed only during the hours shown for lane closures.

The Contractor may be allowed to work during the hours designated as "No freeway lane closure permitted; no work permitted ..." shown on Charts 1 and 2 provided temporary traffic screens are installed on top of temporary railings (Type K) as shown on the plans. Temporary traffic screens shall be furnished, installed, maintained, and removed at the Contractor's expense.

Traffic lanes, which are outside of through traffic lanes, as described in the Charts 1 and 2 may be closed anytime the adjacent connector or ramp is permitted to be closed in accordance with Charts 8 through 25.

Except as otherwise provided in these special provisions, freeway may be closed to public traffic at one location in one direction at a time for the purpose of loop detector installation, striping, or sign structure removal or erection (2 post truss) in conformance with the requirements shown on Charts 3 through 7.

Except as otherwise shown on the traffic handling plans or specified in these special provisions, ramps may be closed as shown on Charts 10 through 25.

No two consecutive on-ramps or consecutive off-ramps in the same direction of travel shall be closed at the same time unless otherwise specified in these special provisions.

If two or more consecutive on-ramps are permitted to be closed, the Contractor, at the Contractor's expense, shall furnish and install special signs for entrance ramp closures (sign SP-4) as directed by the Engineer.

When an off-ramp is closed, the Contractor shall furnish and erect, as directed by the Engineer, a special sign for exit ramp closures (sign SP-3 or SP-5) as shown on the plans.

Special advance notice publicity signs (sign SP-1), as shown on the plans shall be posted as directed by the Engineer, a minimum of 30 calendar days prior to the actual ramp or connector closure. When ramps are closed, public traffic shall be detoured as directed by the Engineer.

Furnishing, erecting, maintaining, and removing special portable freeway detour signs (sign SP-2) along the detour routes as directed by the Engineer will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

Full compensation for furnishing, erecting, maintaining, and removing special signs for exit ramp closures (SP-3 or SP-5), and special advance notice publicity signs (SP-1) as shown on the plans or in these special provisions shall be considered as included in the contract lump sum price paid for traffic control system and no additional payment will be made therefor.

All aforementioned special signs shall become the property of the Contractor at the conclusion of this project and shall be removed from the worksite.

The Contractor shall notify the City of El Monte in writing at the following address at least 35 calendar days in advance of each planned lane closure:

City of El Monte
Public Works Department
City Hall West
11333 Valley Boulevard
El Monte, California 91731-3293

The Contractor shall notify the City of El Monte in writing at the following address at least 90 calendar days in advance of planned closure of the Utah Avenue Pedestrian Undercrossing:

City of El Monte
Public Works Department
City Hall West
11333 Valley Boulevard
El Monte, California 91731-3293

The Contractor shall furnish the City of El Monte a written reminder of planned closures of the Utah Avenue Pedestrian Undercrossing 14 days prior to the first day of closure.

Designated legal holidays are: January 1st, the third Monday in February, the last Monday in May, July 4th, the first Monday in September, November 11th, Thanksgiving Day, and December 25th. When a designated legal holiday falls on a Sunday, the following Monday shall be a designated legal holiday. When November 11th falls on a Saturday, the preceding Friday shall be a designated legal holiday.

Minor deviations from the requirements of this section concerning hours of work which do not significantly change the cost of the work may be permitted upon the written request of the Contractor, if in the opinion of the Engineer, public traffic will be better served and the work expedited. These deviations shall not be adopted by the Contractor until the Engineer has approved the deviations in writing. All other modifications will be made by contract change order.

Chart No. 1 Lane Requirements and Hours of Work																									
Location: E/B Rte 10 Fwy; Baldwin Ave to Rte 605 Fwy																									
FROM HOUR TO HOUR	a.m.											p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	2	1	1	1	1	2	3						X	X	X	X	X	X	X	X			3	2	
Fridays	2	1	1	1	1	2	3						X	X	X	X	X	X	X	X	X	X	X	3	
Saturdays	2	2	2	1	1	1	2	3			X	X	X	X	X	X	X	X	X	X				3	
Sundays	2	2	1	1	1	1	2	2	2	3	3	X	X	X	X	X	X	X	X				3	2	
Working day before designated legal holiday	2	1	1	1	1	2	3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Designated legal holidays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Legend: <div> <div>1</div> <div>Provide at least one through freeway lane open in direction of travel</div> </div> <div> <div>2</div> <div>Provide at least two through freeway lanes open in direction of travel</div> </div> <div> <div>3</div> <div>Provide at least three through freeway lanes open in direction of travel</div> </div> <div> <div></div> <div>No lane closure permitted; work permitted anywhere that does not require freeway lane closure</div> </div> <div> <div>X</div> <div>No lane closure permitted; no work permitted on eastbound roadway</div> </div>																									
REMARKS: Number of Through Traffic Lanes - 4* Legend* - The traffic lane which is outside of the through traffic lanes and is delineated with a double line of pavement markers as shown on "Pavement Markers and Traffic Lines Detail 37 series," in the Construction Details shall not be closed at same time as through traffic lanes, except as otherwise provided in this section.																									

Chart No. 2 Lane Requirements and Hours of Work																									
Location: W/B Rte 10 Fwy; Rte 605 Fwy to Baldwin Ave																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	1	1	1	1	3	X	X	X	X	X	X	X	X	X	X	X	X	X	X		3	3	3	2	
Fridays	1	1	1	1	3	X	X	X	X	X	X	X	X	X	X	X	X	X	X				3	3	
Saturdays	2	1	1	1	1	3			X	X	X	X	X	X	X	X	X	X	X	X	X			3	
Sundays	2	2	1	1	1	1	2	2	3	X	X	X	X	X	X	X	X	X	X	X	X	X		2	
Working day before designated legal holiday	1	1	1	1	3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Designated legal holidays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Legend: <div> <div>1</div> <div>Provide at least one through freeway lane open in direction of travel</div> </div> <div> <div>2</div> <div>Provide at least two through freeway lanes open in direction of travel</div> </div> <div> <div>3</div> <div>Provide at least three through freeway lanes open in direction of travel</div> </div> <div> <div></div> <div>No lane closure permitted; work permitted anywhere that does not require freeway lane closure</div> </div> <div> <div>X</div> <div>No lane closure permitted; no work permitted on westbound Route 10 roadway</div> </div>																									
REMARKS: Number of Through Traffic Lanes - 4* Legend* - The traffic lane which is outside of the through traffic lanes and is delineated with a double line of pavement markers as shown on "Pavement Markers and Traffic Lines Detail 37 series," in the Construction Details shall not be closed at same time as through traffic lanes, except as otherwise provided in this section.																									

Chart No. 3																									
Complete Freeway Closure Lane Requirements and Hours of Work																									
Location: E/B Rte 10 Fwy; Baldwin Ave to Peck Rd																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X																				
Fridays	X	X	X	X	X																				
Saturdays		X	X	X	X	X																			
Sundays		X	X	X	X	X	X																		
Working day before designated legal holiday	X	X	X	X	X																				
Designated legal holidays																									
Legend:																									
X	Freeway may be closed completely																								
	No complete freeway closure is allowed																								
REMARKS:																									
Detour traffic to exit at Baldwin Ave off-ramp; north to Valley Blvd; east to the on-ramp to E/B Rte 10 freeway. Place a PCMS on the right shoulder of the E/B Rte 10 freeway, 1500 feet upstream of the Rosemead Blvd off-ramp with the message: "FREEWAY / CLOSED / AHEAD - BALDWIN / TO / PECK RD". Close the Baldwin Ave and Santa Anita on-ramps to the E/B Rte 10 freeway.																									

Chart No. 4																									
Complete Freeway Closure Lane Requirements and Hours of Work																									
Location: E/B Rte 10 Fwy; Peck Rd to Rte 605																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X																				
Fridays	X	X	X	X	X																				
Saturdays		X	X	X	X	X																			
Sundays		X	X	X	X	X	X																		
Working day before designated legal holiday	X	X	X	X	X																				
Designated legal holidays																									
Legend:																									
X	Freeway may be closed completely																								
	No complete freeway closure is allowed																								
REMARKS:																									
Detour traffic to exit at Peck Rd North off-ramp; north to Ramona Blvd; east to the on-ramp to S/B Rte 605 freeway. Place a PCMS on the right shoulder of the E/B Rte 10 freeway, 1500 feet upstream of the Santa Anita Ave off-ramp with the message: "FREEWAY / CLOSED / AHEAD - PECK RD / TO / RTE 605".																									
Close the Valley Blvd, Exline/Stewart St, and Garvey Ave on-ramps to the E/B Rte 10 freeway.																									

Chart No. 5																													
Complete Freeway Closure Lane Requirements and Hours of Work																													
Location: W/B Rte 10 Fwy; Garvey Ave to Valley Blvd																													
FROM HOUR TO HOUR	a.m.												p.m.																
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12				
Mondays through Thursdays	X	X	X	X																									
Fridays	X	X	X	X																									
Saturdays	X	X	X	X	X																								
Sundays		X	X	X	X	X	X																						
Working day before designated legal holiday	X	X	X	X																									
Designated legal holidays																													
Legend: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: center;">X</td> <td>Freeway may be closed completely</td> </tr> <tr> <td style="width: 5%; text-align: center;"></td> <td>No complete freeway closure is allowed</td> </tr> </table>																										X	Freeway may be closed completely		No complete freeway closure is allowed
X	Freeway may be closed completely																												
	No complete freeway closure is allowed																												
REMARKS: Detour traffic to exit at Garvey/Durfee off-ramp; west on Garvey Ave; west on Valley Blvd to the on-ramp to W/B Rte 10 freeway. Place a PCMS on the right shoulder of the W/B Rte 10 freeway, 1500 feet upstream of the W/B Rte 10 to Rte 605 connector with the message: "FREEWAY / CLOSED / AHEAD - GARVEY / TO / VALLEY". Place a second PCMS at the end on the right shoulder of the Garvey/Durfee off-ramp with the message: "TRUCK / DETOUR - LEFT ON / DURFEE". Truck traffic shall be detoured south on Durfee Ave; west on Valley Blvd to the on-ramp to W/B Rte 10 freeway. Place a third PCMS on the right shoulder of the N/B Rte 605 freeway, 1500 feet upstream of the Valley Blvd off-ramp with the message: "WEST 10 / FREEWAY / CLOSED - GARVEY / TO / VALLEY". Close the S/B 605 to W/B 10 freeway connector. Detour the connector freeway traffic in accordance to Chart 9.																													

Chart No. 6																									
Complete Freeway Closure Lane Requirements and Hours of Work																									
Location: W/B Rte 10 Fwy; Peck Rd to Santa Anita Ave																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X																					
Fridays	X	X	X	X																					
Saturdays	X	X	X	X	X																				
Sundays		X	X	X	X	X	X	X																	
Working day before designated legal holiday	X	X	X	X																					
Designated legal holidays																									
Legend:																									
X	Freeway may be closed completely																								
	No complete freeway closure is allowed																								
REMARKS: Detour traffic to exit at the Valley Blvd off-ramp; south to Garvey Ave; west to Santa Anita Ave; north to the on-ramp to W/B Rte 10 freeway. Place a PCMS on the right shoulder of the W/B Rte 10 freeway, 1500 feet upstream of the Garvey Ave off-ramp with the message: "FREEWAY / CLOSED / AHEAD - VALLEY TO / SANTA / ANITA". Close the Valley Blvd and Peck Rd on-ramps to the W/B Rte 10 freeway.																									

Chart No. 7																									
Complete Freeway Closure Lane Requirements and Hours of Work																									
Location: W/B Rte 10 Fwy; Santa Anita Ave to Baldwin Ave																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X																					
Fridays	X	X	X	X																					
Saturdays	X	X	X	X	X																				
Sundays		X	X	X	X	X	X	X																	
Working day before designated legal holiday	X	X	X	X																					
Designated legal holidays																									
Legend:																									
X	Freeway may be closed completely																								
	No complete freeway closure is allowed																								
REMARKS:																									
Detour traffic to exit at the Santa Anita off-ramp; north to Valley Blvd; west to Temple City Blvd; south to the on-ramp to W/B Rte 10 freeway. Place a PCMS on the right shoulder of the W/B Rte 10 freeway, 1500 feet upstream of the Valley Blvd off-ramp with the message: "FREEWAY / CLOSED / AHEAD - SANTA / ANITA TO / BALDWIN".																									
Close the Santa Anita on-ramp to the W/B Rte 10 freeway.																									

Chart No. 8 Connector Lane Requirements and Hours of Work																									
Location: E/B 10 to S/B 605 off-connector																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X	X															X	X	X	X	
Fridays	X	X	X	X	X	X															X	X	X	X	
Saturdays	X	X	X	X	X	X	X	X	X	X												X	X	X	
Sundays	X	X	X	X	X	X	X	X	X	X	X										X	X	X	X	
Working day before designated legal holiday	X	X	X	X	X	X																			
Designated legal holidays																									
Legend:																									
X	Connector may be closed																								
	Work permitted that does not require connector lane closure																								
REMARKS:																									
Detour traffic to the N/B Rte 605 freeway to exit and re-enter the freeway at Ramona Blvd off-ramp. Place a PCMS on the right shoulder of the E/B Rte 10 freeway, by Garvey Ave on-ramp gore with the message: "S 605 / EXIT / CLOSED - USE / N 605 TO / RAMONA".																									

Chart No. 9 Connector Lane Requirements and Hours of Work																									
Location: S/B 605 to W/B 10 on-connector																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X	X														X	X	X	X	X	X
Fridays	X	X	X	X	X	X														X	X	X	X	X	X
Saturdays	X	X	X	X	X	X	X	X	X									X	X	X	X	X	X	X	X
Sundays	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X
Working day before designated legal holiday	X	X	X	X	X	X																			
Designated legal holidays																									
Legend:																									
X	Connector may be closed																								
	Work permitted that does not require connector lane closure																								
REMARKS:																									
Detour traffic to exit at Ramona Blvd off-ramp; west to Peck Rd; south to the on-ramp to W/B Rte 10 freeway. Place a PCMS on the right shoulder of the S/B Rte 605 freeway, 1500 feet upstream of the Ramona off-ramp with the message: "WEST 10 / EXIT / CLOSED - DETOUR / USE / RAMONA".																									

Chart No. 10																									
Ramp Lane Requirements and Hours of Work																									
Location: E/B Rte 10 Fwy off-ramp to Baldwin Ave																									
	a.m.												p.m.												
FROM HOUR TO HOUR	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X	X																			X
Fridays	X	X	X	X	X	X																			X
Saturdays	X	X	X	X	X	X	X	X	X															X	X
Sundays	X	X	X	X	X	X	X	X	X	X	X													X	X
Working day before designated legal holiday	X	X	X	X	X	X																			
Designated legal holidays																									
Legend:																									
X	Ramp may be closed																								
	Work permitted anywhere that does not require ramp lane closure																								
REMARKS:																									

Chart No. 11																									
Ramp Lane Requirements and Hours of Work																									
Location: E/B Rte 10 Fwy on-ramp from Baldwin Ave																									
	a.m.												p.m.												
FROM HOUR TO HOUR	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X	X																	X	X	X
Fridays	X	X	X	X	X	X																	X	X	X
Saturdays	X	X	X	X	X	X	X	X													X	X	X	X	
Sundays	X	X	X	X	X	X	X	X	X												X	X	X	X	
Working day before designated legal holiday	X	X	X	X	X	X																			
Designated legal holidays																									
Legend:																									
X	Ramp may be closed																								
	Work permitted anywhere that does not require ramp lane closure																								
REMARKS:																									

Chart No. 12																									
Ramp Lane Requirements and Hours of Work																									
Location: E/B Rte 10 Fwy off-ramp to Santa Anita Ave																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X	X					X	X	X	X	X	X				X	X	X	X	X	X
Fridays	X	X	X	X	X	X					X	X	X	X	X	X				X	X	X	X	X	X
Saturdays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sundays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Working day before designated legal holiday	X	X	X	X	X	X																			
Designated legal holidays																									
Legend: <div style="display: flex; border: 1px solid black; padding: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 10px; display: flex; align-items: center; justify-content: center;">X</div> Ramp may be closed </div> <div style="display: flex; border: 1px solid black; padding: 5px; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 10px;"></div> Work permitted anywhere that does not require ramp lane closure </div>																									
REMARKS: The full width of the travel way shall be open for use by public traffic when construction operations are not actively in progress.																									

Chart No. 13																									
Ramp Lane Requirements and Hours of Work																									
Location: E/B Rte 10 Fwy on-ramp from Santa Anita Ave																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X	X					X	X	X									X	X	X	X
Fridays	X	X	X	X	X	X					X	X	X										X	X	X
Saturdays	X	X	X	X	X	X	X	X	X	X										X	X	X	X	X	
Sundays	X	X	X	X	X	X	X	X	X	X	X									X	X	X	X	X	
Working day before designated legal holiday	X	X	X	X	X	X																			
Designated legal holidays																									
Legend: <div style="display: flex; border: 1px solid black; padding: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 10px; display: flex; align-items: center; justify-content: center;">X</div> Ramp may be closed </div> <div style="display: flex; border: 1px solid black; padding: 5px; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 10px;"></div> Work permitted anywhere that does not require ramp lane closure </div>																									
REMARKS:																									

Chart No. 14																									
Ramp Lane Requirements and Hours of Work																									
Location: W/B Rte 10 Fwy off-ramp to Santa Anita Ave																									
	a.m.												p.m.												
FROM HOUR TO HOUR	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X																X	X	X	X	X
Fridays	X	X	X	X	X																	X	X	X	X
Saturdays	X	X	X	X	X	X	X	X	X	X											X	X	X	X	X
Sundays	X	X	X	X	X	X	X	X	X	X	X	X							X	X	X	X	X	X	X
Working day before designated legal holiday	X	X	X	X	X																				
Designated legal holidays																									
Legend: <div style="display: flex; border: 1px solid black; padding: 5px;"> <div style="border: 1px solid black; width: 30px; height: 20px; margin-right: 10px; display: flex; align-items: center; justify-content: center;">X</div> Ramp may be closed </div> <div style="display: flex; border: 1px solid black; padding: 5px; margin-top: 5px;"> <div style="border: 1px solid black; width: 30px; height: 20px; margin-right: 10px;"></div> Work permitted anywhere that does not require ramp lane closure </div>																									
REMARKS:																									

Chart No. 15																									
Ramp Lane Requirements and Hours of Work																									
Location: W/B Rte 10 Fwy on-ramp from Santa Anita Ave																									
	a.m.												p.m.												
FROM HOUR TO HOUR	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X																			X	X
Fridays	X	X	X	X	X																			X	X
Saturdays	X	X	X	X	X	X	X	X																X	X
Sundays	X	X	X	X	X	X	X	X	X														X	X	X
Working day before designated legal holiday	X	X	X	X	X																				
Designated legal holidays																									
Legend: <div style="display: flex; border: 1px solid black; padding: 5px;"> <div style="border: 1px solid black; width: 30px; height: 20px; margin-right: 10px; display: flex; align-items: center; justify-content: center;">X</div> Ramp may be closed </div> <div style="display: flex; border: 1px solid black; padding: 5px; margin-top: 5px;"> <div style="border: 1px solid black; width: 30px; height: 20px; margin-right: 10px;"></div> Work permitted anywhere that does not require ramp lane closure </div>																									
REMARKS:																									

Chart No. 16																									
Ramp Lane Requirements and Hours of Work																									
Location: E/B Rte 10 Fwy off-ramp to Peck Rd South																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X	X					X	X	X	X	X	X					X	X	X	X	X
Fridays	X	X	X	X	X	X					X	X	X	X	X	X					X	X	X	X	X
Saturdays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sundays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Working day before designated legal holiday	X	X	X	X	X	X																			
Designated legal holidays																									
Legend: <div style="display: flex; border: 1px solid black; padding: 5px;"> <div style="border: 1px solid black; width: 30px; height: 20px; margin-right: 10px; display: flex; align-items: center; justify-content: center;">X</div> Ramp may be closed </div> <div style="display: flex; border: 1px solid black; padding: 5px; margin-top: 5px;"> <div style="border: 1px solid black; width: 30px; height: 20px; margin-right: 10px;"></div> Work permitted anywhere that does not require ramp lane closure </div>																									
REMARKS: The full width of the travel way shall be open for use by public traffic when construction operations are not actively in progress.																									

Chart No. 17																									
Ramp Lane Requirements and Hours of Work																									
Location: E/B Rte 10 Fwy off-ramp to Peck Rd North																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X	X																	X	X	X
Fridays	X	X	X	X	X	X																		X	X
Saturdays	X	X	X	X	X	X	X	X	X	X	X	X												X	X
Sundays	X	X	X	X	X	X	X	X	X	X	X	X											X	X	X
Working day before designated legal holiday	X	X	X	X	X	X																			
Designated legal holidays																									
Legend: <div style="display: flex; border: 1px solid black; padding: 5px;"> <div style="border: 1px solid black; width: 30px; height: 20px; margin-right: 10px; display: flex; align-items: center; justify-content: center;">X</div> Ramp may be closed </div> <div style="display: flex; border: 1px solid black; padding: 5px; margin-top: 5px;"> <div style="border: 1px solid black; width: 30px; height: 20px; margin-right: 10px;"></div> Work permitted anywhere that does not require ramp lane closure </div>																									
REMARKS:																									

Chart No. 18																									
Ramp Lane Requirements and Hours of Work																									
Location: W/B Rte 10 Fwy off-ramp to Peck Rd North																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X	X					X	X	X	X	X	X					X	X	X	X	X
Fridays	X	X	X	X	X	X					X	X	X	X	X	X					X	X	X	X	X
Saturdays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sundays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Working day before designated legal holiday	X	X	X	X	X	X																			
Designated legal holidays																									
Legend: <div style="display: flex; border: 1px solid black; padding: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 10px; display: flex; align-items: center; justify-content: center;">X</div> Ramp may be closed </div> <div style="display: flex; border: 1px solid black; padding: 5px; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 10px;"></div> Work permitted anywhere that does not require ramp lane closure </div>																									
REMARKS: The full width of the travel way shall be open for use by public traffic when construction operations are not actively in progress.																									

Chart No. 19																									
Ramp Lane Requirements and Hours of Work																									
Location: E/B Rte 10 Fwy on-ramp from Valley Blvd																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X	X															X	X	X	X	X
Fridays	X	X	X	X	X	X															X	X	X	X	X
Saturdays	X	X	X	X	X	X	X	X	X	X	X						X	X	X	X	X	X	X	X	X
Sundays	X	X	X	X	X	X	X	X	X	X	X						X	X	X	X	X	X	X	X	X
Working day before designated legal holiday	X	X	X	X	X	X																			
Designated legal holidays																									
Legend: <div style="display: flex; border: 1px solid black; padding: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 10px; display: flex; align-items: center; justify-content: center;">X</div> Ramp may be closed </div> <div style="display: flex; border: 1px solid black; padding: 5px; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 10px;"></div> Work permitted anywhere that does not require ramp lane closure </div>																									
REMARKS:																									

Chart No. 20 Ramp Lane Requirements and Hours of Work																										
Location: W/B Rte 10 Fwy off-ramp to Valley Blvd W/B Rte 10 Fwy on-ramp from Valley Blvd																										
FROM HOUR TO HOUR	a.m.												p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11		12
Mondays through Thursdays	X	X	X	X	X	X					X	X	X	X	X	X	X				X	X	X	X	X	
Fridays	X	X	X	X	X	X					X	X	X	X	X	X	X				X	X	X	X	X	
Saturdays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Sundays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Working day before designated legal holiday	X	X	X	X	X	X																				
Designated legal holidays																										
Legend:																										
X	Ramp may be closed																									
	Work permitted anywhere that does not require ramp lane closure																									
REMARKS: The full width of the travel way shall be open for use by public traffic when construction operations are not actively in progress.																										

Chart No. 21 Ramp Lane Requirements and Hours of Work																										
Location: W/B Rte 10 Fwy off-ramp to Peck Rd South																										
FROM HOUR TO HOUR	a.m.												p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
Mondays through Thursdays	X	X	X	X	X	X					X	X	X	X	X	X					X	X	X	X	X	
Fridays	X	X	X	X	X	X					X	X	X	X	X	X					X	X	X	X	X	
Saturdays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Sundays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Working day before designated legal holiday	X	X	X	X	X	X																				
Designated legal holidays																										
Legend:																										
X	Ramp may be closed																									
	Work permitted anywhere that does not require ramp lane closure																									
REMARKS:																										
The full width of the travel way shall be open for use by public traffic when construction operations are not actively in progress.																										

Chart No. 22 Ramp Lane Requirements and Hours of Work																									
Location: W/B Rte 10 Fwy on-ramp from Peck Rd																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X	X														X	X	X	X	X	
Fridays	X	X	X	X	X	X															X	X	X	X	
Saturdays	X	X	X	X	X	X	X	X	X												X	X	X	X	
Sundays	X	X	X	X	X	X	X	X	X	X											X	X	X	X	
Working day before designated legal holiday	X	X	X	X	X	X																			
Designated legal holidays																									
Legend:																									
X	Ramp may be closed																								
	Work permitted anywhere that does not require ramp lane closure																								
REMARKS:																									

Chart No. 23 Ramp Lane Requirements and Hours of Work																									
Location: E/B Rte 10 Fwy on-ramp from Exline/Stewart St.																									
FROM HOUR TO HOUR	a.m.												p.m.												
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays	X	X	X	X	X	X					X	X	X	X	X	X					X	X	X	X	X
Fridays	X	X	X	X	X	X					X	X	X	X	X	X					X	X	X	X	X
Saturdays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sundays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Working day before designated legal holiday	X	X	X	X	X	X																			
Designated legal holidays																									
Legend:																									
X	Ramp may be closed																								
	Work permitted anywhere that does not require ramp lane closure																								
REMARKS:																									
The full width of the travel way shall be open for use by public traffic when construction operations are not actively in progress.																									

Chart No. 24 Ramp Lane Requirements and Hours of Work																										
Location: E/B Rte 10 Fwy on-ramp from Garvey Ave/Durfee Ave																										
FROM HOUR TO HOUR	a.m.												p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
Mondays through Thursdays	X	X	X	X	X	X																		X	X	
Fridays	X	X	X	X	X	X																		X	X	
Saturdays	X	X	X	X	X	X	X	X	X															X	X	
Sundays	X	X	X	X	X	X	X	X	X	X	X													X	X	
Working day before designated legal holiday	X	X	X	X	X	X																				
Designated legal holidays																										
Legend:																										
X	Ramp may be closed																									
	Work permitted anywhere that does not require ramp lane closure																									
REMARKS:																										

Chart No. 25 Ramp Lane Requirements and Hours of Work																										
Location: W/B Rte 10 Fwy off-ramp to Garvey Ave/Durfee Ave																										
FROM HOUR TO HOUR	a.m.												p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11		12
Mondays through Thursdays	X	X	X	X	X	X																X	X	X	X	
Fridays	X	X	X	X	X	X																	X	X	X	
Saturdays	X	X	X	X	X	X	X	X	X														X	X	X	
Sundays	X	X	X	X	X	X	X	X	X	X												X	X	X	X	
Working day before designated legal holiday	X	X	X	X	X	X																				
Designated legal holidays																										
Legend:																										
X	Ramp may be closed																									
	Work permitted anywhere that does not require ramp lane closure																									
REMARKS:																										

Pedestrian access facilities shall be provided through construction areas within the right of way as shown on the plans and as specified herein. Pedestrian walkways shall be surfaced with asphalt concrete, portland cement concrete or timber. The surface shall be skid resistant and free of irregularities. Hand railings shall be provided on each side of pedestrian walkways as necessary to protect pedestrian traffic from hazards due to construction operations or adjacent vehicular traffic. Protective overhead covering shall be provided as necessary to insure protection from falling objects and drip from overhead structures.

In addition to the required openings through falsework, pedestrian facilities shall be provided during pile driving, footing, wall, and other bridge construction operations. At least one walkway shall be available at all times. If the Contractor's operations require the closure of one walkway, then another walkway shall be provided nearby, off the traveled roadway.

Railings shall be constructed of wood, S4S, and shall be painted white. Railings and walkways shall be maintained in good condition. Walkways shall be kept clear of obstructions.

Full compensation for providing said pedestrian facilities shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

Erection of girders over Peck Road, Santa Anita Avenue, Cogswell Road and Valley Boulevard shall be undertaken on one span at a time. During girder erection, public traffic in the lanes over which girders are being placed shall be routed around the work area by means of a local detour.

Erection and removal of falsework at locations where falsework openings are required shall be undertaken one location at a time. During falsework erection and removal, public traffic in the lanes over which falsework is being erected or removed shall be routed around the work area on adjacent streets or where 2 falsework openings are called for at one location, the public traffic may be routed through the work and through the opening for the opposing lanes of traffic by means of a local detour. Erection shall include all adjustments or removal of falsework components prior to concrete placement that contribute to the horizontal stability of the falsework system. Removal shall include lowering falsework, blowing sand from sand jacks, turning screws on screw jacks, and removing wedges.

Local detours shall be not less than 11 feet in width, adjacent to the median side of the opposing traffic lanes, and shall not encroach on the lanes.

Rerouting traffic during erection or removal of falsework shall be undertaken only between the hours of 9:00 a.m. and 3:00 p.m., Monday through Friday, except designated legal holidays and days preceding designated legal holidays, for the period necessary for erecting or removing the falsework.

Regardless of the construction procedure, methods and equipment selected, the Contractor shall have necessary materials and equipment on the site to erect or remove the falsework in any one span or over any one opening prior to detouring or stopping public traffic, and shall erect or remove the girders or falsework in an expeditious manner in order that inconvenience to public traffic will be at a minimum.

The Contractor may occupy one 10-foot lane while placing or removing forms for the superstructure of bridges over Santa Anita Avenue which are to remain open. Occupation of a traffic lane because of form work at a location will be permitted only during such times as construction operations are actually in progress and only during daylight hours or between the hours of 9:00 a.m. and 3:00 p.m., Monday through Friday, except during hours shown on the charts included in this section "Maintaining Traffic," designated legal holidays and days preceding designated legal holidays, or when necessary for the safety of public traffic.

During jacking of the superstructure at Garvey Avenue Off-Ramp Undercrossing, traffic shall be detoured as shown on the plans.

10-1.17 CLOSURE REQUIREMENTS AND CONDITIONS

Lane closures shall conform to the provisions in "Maintaining Traffic" of these special provisions and these special provisions.

The term closure, as used herein, is defined as the closure of a traffic lane or lanes, including ramp or connector lanes, within a single traffic control system.

CLOSURE SCHEDULE

By noon Monday, the Contractor shall submit a written schedule of planned closures for the following week period, defined as Friday noon through the following Friday noon.

The Closure Schedule shall show the locations and times when the proposed closures are to be in effect. The Contractor shall use the Closure Schedule request forms furnished by the Engineer. Closure Schedules submitted to the Engineer with incomplete, unintelligible or inaccurate information will be returned for correction and resubmittal. The Contractor will be notified of disapproved closures or closures that require coordination with other parties as a condition of approval.

Amendments to the Closure Schedule, including adding additional closures, shall be submitted to the Engineer, in writing, at least 3 working days in advance of a planned closure. Approval of amendments to the Closure Schedule will be at the discretion of the Engineer.

The Contractor shall confirm, in writing, all scheduled closures by no later than 8:00 a.m. 3 working days prior to the date on which the closure is to be made. Approval or denial of scheduled closures will be made no later than 4:00 p.m. 2 working days prior to the date on which the closure is to be made. Closures not confirmed or approved will not be allowed.

Confirmed closures that are cancelled due to unsuitable weather may be rescheduled at the discretion of the Engineer for the following working day.

CONTINGENCY PLAN

The Contractor shall prepare a contingency plan for reopening closures to public traffic. The Contractor shall submit the contingency plan for a given operation to the Engineer within one working day of the Engineer's request.

LATE REOPENING OF CLOSURES

If a closure is not reopened to public traffic by the specified time, work shall be suspended in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. The Contractor shall not make any further closures until the Engineer has accepted a work plan, submitted by the Contractor, that will insure that future closures will be reopened to public traffic at the specified time. The Engineer will have 2 working days to accept or reject the Contractor's proposed work plan. The Contractor will not be entitled to any compensation for the suspension of work resulting from the late reopening of closures.

For each 10-minute interval, or fraction thereof past the time specified to reopen the closure, the Department will deduct \$6,300 per interval from moneys due or that may become due the Contractor under the contract.

COMPENSATION

The Contractor shall notify the Engineer of any delay in the Contractor's operations due to the following conditions, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of those conditions, and the Contractor's loss due to that delay could not have been avoided by rescheduling the affected closure or by judicious handling of forces, equipment and plant, the delay will be considered a right of way delay within the meaning of Section 8-1.09, "Right of Way Delays," and compensation for the delay will be determined in conformance with the provisions in Section 8-1.09:

- A. The Contractor's proposed Closure Schedule is denied and his planned closures are within the time frame allowed for closures in "Maintaining Traffic" of these special provisions, except that the Contractor will not be entitled to any compensation for amendments to the Closure Schedule that are not approved.
- B. The Contractor is denied a confirmed closure.

Should the Engineer direct the Contractor to remove a closure prior to the time designated in the approved Closure Schedule, any delay to the Contractor's schedule due to removal of the closure will be considered a right of way delay within the meaning of Section 8-1.09, "Right of Way Delays," and compensation for the delay will be determined in conformance with the provisions in Section 8-1.09.

10-1.18 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

A traffic control system shall consist of closing traffic lanes and ramps in conformance with the details shown on the plans, the provisions of Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, the provisions under "Maintaining Traffic" and "Construction Area Signs" of these special provisions and these special provisions.

The provisions in this section will not relieve the Contractor from the responsibility to provide such additional devices or take such measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications.

When performing traffic control on the high occupancy vehicle lane (HOV lane) or where the median is less than 10 feet, the Contractor shall conform to the requirements under the moving lane closures for truck-mounted attenuators (TMA).

During traffic stripe operations and pavement marker placement operations using bituminous adhesive, traffic shall be controlled, at the option of the Contractor, with either stationary or moving type lane closures. During other operations, traffic shall be controlled with stationary lane closures. Attention is directed to the provisions in Section 84-1.04, "Protection From Damage," and Section 85-1.06, "Placement," of the Standard Specifications.

If any components in the traffic control system are displaced or cease to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair the components to the original condition or replace the components and shall restore the component to the original location.

STATIONARY LANE CLOSURE.--When lane and ramp closures are made for work periods only, at the end of each work period, components of the traffic control system, except portable delineators placed along open trenches or excavation adjacent to the traveled way, shall be removed from the traveled way and shoulder. If the Contractor so elects, the components may be stored at selected central locations, designated by the Engineer within the limits of the highway right of way.

Each vehicle used to place, maintain and remove components of a traffic control system on multilane highways shall be equipped with a Type II flashing arrow sign which shall be in operation when the vehicle is being used for placing, maintaining, or removing the components. Vehicles equipped with Type II flashing arrow sign not involved in placing, maintaining, or removing the components when operated within a stationary type lane closure shall only display the caution display mode. The sign shall be controllable by the operator of the vehicle while the vehicle is in motion. The flashing arrow sign shown on the plans shall not be used on the vehicles which are doing the placing, maintaining and removing of components of a traffic control system, and shall be in place before a lane closure requiring its use is completed.

The 500-foot section of lane closure, shown along lane lines between the 1,000-foot lane closure tapers on the plans entitled "Traffic Control System for Lane Closures on Freeways and Expressways" and "Traffic Control System for Lane and Complete Closures on Freeways and Expressways" shall not be used.

The traffic cones shown to be placed transversely across closed traffic lanes and shoulders on the plans entitled "Traffic Control System for Lane Closures on Freeways and Expressways" and "Traffic Control System for Lane and Complete Closures on Freeways and Expressways" shall not be placed.

MOVING LANE CLOSURE.--Flashing arrow signs used in moving lane closures shall be truck-mounted. Changeable message signs used in moving lane closure operations shall conform to the provisions in Section 12-3.12, "Portable Changeable Message Signs," of the Standard Specifications, except the signs shall be truck-mounted and the full operation height of the bottom of the sign may be less than 7 feet above the ground, but should be as high as practicable.

Truck-mounted attenuators (TMA) for use in moving lane closures shall be any of the following approved models, or equal:

(1)

Hexfoam TMA Series 3000,
Alpha 1000 TMA Series 1000 and
Alpha 2001 TMA Series 2001

Manufacturer:	Distributor(Northern):
Energy Absorption Systems, Inc. One East Wacker Drive Chicago, IL 60601-2076 Telephone (312) 467-6750	Traffic Control Service, Inc. 8585 Thys Court Sacramento, CA 95828 Telephone 1-(800) 884-8274 FAX (916) 387-9734

Distributor(Southern):

Traffic Control Service,
Inc.
1881 Betmor Lane
Anaheim, CA 92805
Telephone 1-
(800) 222-8274

(2)

Cal T-001 Model 2 or Model 3

Manufacturer:	Distributor:
Hexcel Corporation 11711 Dublin Blvd. P.O. Box 2312 Dublin, CA 94568 Telephone (510) 828-4200	Hexcel Corporation 11711 Dublin Blvd. P.O. Box 2312 Dublin, CA 94568 Telephone (510) 828-4200

(3)

Renco Rengard Model Nos.
CAM 8-815 and RAM 8-815

Manufacturer:

Distributor:

Renco Inc.
1582 Pflugerville Loop
Road
P.O. Box 730
Pflugerville, TX
78660-0730
Telephone 1-(800)
654-8182

Renco Inc.
1582 Pflugerville Loop
Road
P.O. Box 730
Pflugerville, TX
78660-0730
Telephone 1-(800)
654-8182

Each TMA shall be individually identified with the manufacturer's name, address, TMA model number, and a specific serial number. The names and numbers shall each be a minimum 1/2 inch high, and located on the left (street) side at the lower front corner. The TMA shall have a message next to the name and model number in 1/2 inch high letters which states, "The bottom of this TMA shall be _____ inches \pm _____ inches above the ground at all points for proper impact performance." Any TMA which is damaged or appears to be in poor condition shall not be used unless recertified by the manufacturer. The Engineer shall be the sole judge as to whether used TMAs supplied under this contract need recertification. Each unit shall be certified by the manufacturer to meet the requirements for TMA in accordance with the standards established by the Transportation Laboratory.

Approvals for new TMA designs proposed as equal to the above approved models shall be in conformance with the procedures (including crash testing) established by the Transportation Laboratory. For information regarding submittal of new designs for evaluation contact:

Transportation Laboratory
5900 Folsom Boulevard
Sacramento, CA 95819

New TMAs proposed as equal to approved TMAs or approved TMAs determined by the Engineer to need recertification shall not be used until approved or recertified by the Transportation Laboratory.

PAYMENT.--The contract lump sum price paid for traffic control system shall include full compensation for furnishing all labor, materials (including signs), tools, equipment and incidentals, and for doing all the work involved in placing, removing, storing, maintaining, moving to new locations, replacing and disposing of the components of the traffic control system as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The adjustment provisions in Section 4-1.03, "Changes," of the Standard Specifications, shall not apply to the item of traffic control system. Adjustments in compensation for traffic control system will be made only for increased or decreased traffic control system required by changes ordered by the Engineer and will be made on the basis of the cost of the increased or decreased traffic control necessary. Such adjustment will be made on a force account basis as provided in Section 9-1.03, "Force Account Payment," of the Standard Specifications for increased work, and estimated on the same basis in the case of decreased work.

Traffic control system required by work which is classed as extra work, as provided in Section 4-1.03D of the Standard Specifications, will be paid for as a part of the extra work.

10-1.19 PORTABLE FLASHING BEACONS

Portable flashing beacons conforming to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications shall be furnished, placed and maintained at the locations shown on the plans or as directed by the Engineer.

If flashing beacons are displaced or are not in an upright position, from any cause, during the progress of the work, the Contractor shall immediately repair and repaint or replace the flashing beacons in their original locations.

After initial placement, if flashing beacons are moved from location to location, as ordered by the Engineer, the cost of such moves will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

The quantity of portable flashing beacons to be paid for will be measured as units determined from actual count in place at the locations shown on the plans or at other locations as determined by the Engineer. Each flashing beacon will be counted once at each location shown on the plans, or at other locations as determined by the Engineer, repaired or replacement portable flashing beacons placed at such locations will not be considered as additional units for payment purposes. Portable flashing beacons shown on the plans as part of a traffic control system shall be considered as part of that traffic control system and will be paid for as specified under "Traffic Control System for Lane Closures," elsewhere in these special provisions.

The contract unit price paid for flashing beacon (portable) shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing, placing, operating, maintaining, repairing, replacing and removing portable flashing beacons, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.20 BARRICADE

Barricades shall be furnished, placed and maintained at the locations shown on the plans, specified in the Standard Specifications or in these special provisions or where designated by the Engineer. Barricades shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Attention is directed to "Prequalified and Tested Signing and Delineation Materials" of these special provisions regarding retroreflective sheeting for barricades.

Delete the third paragraph of Section 12-3.02, "Barricades," of the Standard Specifications.

Markings for barricade rails shall be alternate orange and white stripes. The entire area of orange and white stripes shall be Type-I, engineering grade, or Type-II, super engineering grade, retroreflective sheeting. The color of the orange retroreflective sheeting shall conform to PR No. 6, Highway Orange, of the Federal Highway Administration's Color Tolerance Chart. Retroreflective sheeting shall be placed on rail surfaces in such a manner that no air bubbles or voids are present between the rail surface and retroreflective sheeting. The predominate color for barricade components other than rails shall be white, except that unpainted galvanized metal or aluminum may be used.

Construction area sign and marker panels conforming to the provisions in Section 12-3.06, "Construction Area Signs," of the Standard Specifications shall be installed on barricades in a manner determined by the Engineer at the locations shown on the plans.

Sign panels for construction area signs and marker panels installed on barricades shall conform to the provisions in Section 12-3.06A, "Stationary Mounted Signs," of the Standard Specifications and these special provisions.

Full compensation for furnishing, installing, maintaining, and removing construction area signs and markers on barricades shall be considered as included in the contract unit price paid for the type of barricade involved and no separate payment will be made therefor.

Barricades shown on the plans as part of a traffic control system will be paid for as provided in "Traffic Control System for Lane Closure," of these special provisions, and will not be included in counts for payment for barricades.

10-1.21 PORTABLE CHANGEABLE MESSAGE SIGN

Portable changeable message signs shall be furnished, placed, operated, and maintained at locations provided for in these special provisions and stage construction plans, or where designated by the Engineer in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Delete the second paragraph of Section 12-3.06B, "Portable Signs," of the Standard Specifications.

Sign panels for portable signs shall conform to the provisions for sign panels for stationary mounted signs in Section 12-3.06A, "Stationary Mounted Signs," or shall be Type VI retroreflective sheeting, or shall be cotton drill fabric, flexible industrial nylon fabric or other approved fabric. Fabric signs shall not be used during the hours of darkness. Size, color, and legend requirements for portable signs shall be as described for stationary mounted sign panels in Section 12-3.06A. The height to the bottom of the sign panel above the edge of traveled way shall be at least one foot.

Attention is directed to Charts 3 through 9 in "Maintaining Traffic" of these special provisions concerning the use and locations of the portable changeable message signs.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing, placing, operating, maintaining, repairing, replacing, transporting from location to location, and removing the portable changeable message signs as specified in these special provisions shall be considered as included in the contract lump sum price paid for traffic control system and no additional payment will be made therefor.

10-1.22 TEMPORARY RAILING

Temporary railing (Type K) shall be placed as shown on the plans, specified in the Standard Specifications or these special provisions or where ordered by the Engineer and shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Delete the fourteenth paragraph of Section 12-3.08, "Temporary Railing (Type K)," of the Standard Specifications.

Each rail unit placed within 10 feet of a traffic lane shall have a reflector installed on top of the rail. Reflectors shall be as specified in these special provisions, and adhesive shall conform to the reflector manufacturer's recommendations. A Type P marker panel shall also be installed at each end of railing installed adjacent to a two-lane, two-way highway and at the end facing traffic of railing installed adjacent to a one-way roadbed. If the railing is placed on a skew, the marker shall be installed at the end of the skew nearest the traveled way. Type P marker panels shall conform to the provisions in Section 82, "Markers and Delineators," except that the Contractor shall furnish the marker panels.

Reflectors on temporary railing (Type K) shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials," of these special provisions.

Temporary railing (Type K), conforming to the details shown on 1995 Standard Plan T3 or 1997 Standard Plan T3, may be used. Temporary railing (Type K) fabricated prior to January 1, 1993, and conforming to 1988 Standard Plan B11-30 may be used, provided the fabrication date is printed on the required Certificate of Compliance and vertical holes are not drilled in the top of the temporary railing to secure temporary traffic screen to the temporary railing.

Attention is directed to "Public Safety" and "Order of Work" of these special provisions.

Temporary railing (Type K) placed in conformance with the provisions in "Public Safety" of these special provisions will be neither measured nor paid for.

Delete the fourth paragraph of Section 12-4.01, "Measurement and Payment," of the Standard Specifications.

Temporary railing (Type K) will be measured by the linear foot along the top of the railing, at each location shown on the plans, specified, or ordered by the Engineer. If the Engineer orders a lateral move of the temporary railing (Type K), and the repositioning is not shown on the plans, moving the temporary railing will be paid for as extra work as provided in Section 4-1.03D and the temporary railing will not be measured in the new position. Temporary railing (Type K) placed in excess of the length shown, specified, or ordered will not be paid for. The contract price paid per linear foot for temporary railing (Type K) shall include full compensation for furnishing all labor materials (including reinforcement, Type P marker panels and reflectors), tools, equipment and incidentals, and for doing all the work involved in furnishing, placing, maintaining, repairing, replacing, and removing the temporary railing, including excavation and backfill, drilling holes and bonding threaded rods or dowels when required, removing threaded rods or dowels and filling the drilled holes with mortar and moving and replacing removable panels as required, complete in place, as shown on the plans, as specified in the Standard Specifications these special provisions, and as directed by the Engineer.

10-1.23 CHANNELIZER

Channelizers shall conform to the provisions in Sections 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Channelizers shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials," of these special provisions.

When no longer required for the work as determined by the Engineer, channelizers and underlying adhesive used to cement the channelizer bases to the pavement shall be removed. Removed channelizers and adhesive shall become the property of the Contractor and shall be removed from the site of work.

10-1.24 TEMPORARY TRAFFIC SCREEN

Temporary traffic screen shall be furnished, installed, and maintained on top of temporary railing (Type K) as specified elsewhere in these special provisions, and shall conform to the provisions specified for traffic handling equipment and devices in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Temporary traffic screen panels shall be new or used CDX Grade, or better, plywood or weather resistant strandboard mounted and anchored on temporary railing (Type K). Wale boards shall be new or used Douglas fir, rough sawn, Construction Grade, or better. Pipe screen supports shall be new or used galvanized steel pipe, Schedule 40. Nuts, bolts, and washers shall be cadmium plated. Screws shall be black or cadmium plated flat head, cross slotted screws with full thread length.

When no longer required, as determined by the Engineer, temporary traffic screen shall be removed from the site of the work.

Attention is directed to "Maintaining Traffic" of these special provisions regarding temporary traffic screen provided at the Contractor's option.

10-1.25 TEMPORARY CRASH CUSHION (REACT)

This work shall consist of furnishing, installing, maintaining, and removing when no longer required, temporary crash cushion (REACT 9SCBS) at each location shown on the plans, and as specified in these special provisions.

Attention is directed to "Public Safety," "Order of Work", and "Temporary Railing" of these special provisions.

GENERAL.--The temporary crash cushion (REACT 9SCBS) shall be in place prior to opening the lanes adjacent to the fixed obstacle to public traffic.

Temporary crash cushions (REACT 9SCBS) shall be maintained in place at each location, including times when work is not actively in progress.

MATERIALS.--Temporary crash cushions (REACT), concrete anchorage devices, anchor slab, and W-Beam connections to barriers shall be in conform to the requirements for "Crash Cushion (REACT)" of these special provisions.

Temporary crash cushions damaged due to the Contractor's operations shall be repaired immediately by the Contractor at the Contractor's expense. Temporary crash cushions damaged beyond repair, as determined by the Engineer, due to the Contractor's operations shall be removed and replaced by the Contractor at the Contractor's expense.

INSTALLATION.--Temporary crash cushions shall be installed in conformance with the manufacturer's recommendations.

At the completion of the project, temporary crash cushion (REACT 9SCBS), including anchoring devices, slabs and W-Beam connections, shall become the property of the Contractor and shall be removed from the site of the work.

MEASUREMENT AND PAYMENT.--Temporary crash cushion (REACT 9SCBS) will be measured by the unit determined from the actual count of temporary crash cushion (REACT 9SCBS) used in the work or ordered by the Engineer. Temporary crash cushion (REACT 9SCBS) units placed in conformance with the provisions in "Public Safety" of these special provisions will not be measured nor paid for.

Repairing temporary crash cushions damaged by public traffic will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Temporary crash cushions damaged beyond repair by public traffic, when ordered by the Engineer, shall be removed and replaced immediately by the Contractor. Temporary crash cushions replaced due to damage by public traffic will be measured and paid for as temporary crash cushion (REACT 9SCBS).

The contract unit price paid for temporary crash cushion (REACT 9SCBS) shall include full compensation for furnishing all labor, materials (including anchor bolts, nuts, washers, and marker panels), tools, equipment, and incidentals, and for doing all work involved in furnishing, installing, maintaining, and removing from the site of the work when no longer required (including those damaged by public traffic) temporary crash cushions, complete in place, as shown on the plans, including structure excavation, structure backfill, bar reinforcing steel, concrete anchor slab, transition plate, W-beam connector, and for furnishing and installing high strength bolts and plate washers, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.26 TEMPORARY CRASH CUSHION MODULE

This work shall consist of furnishing, installing, and maintaining sand filled temporary crash cushion modules in groupings or arrays at each location shown on the plans, as specified in these special provisions or where designated by the Engineer. The grouping or array of sand filled modules shall form a complete sand filled temporary crash cushion in conformance with the details shown on the plans and these special provisions.

Attention is directed to "Public Safety," "Order of Work", and "Temporary Railing" of these special provisions.

GENERAL.--Whenever the work or the Contractor's operations establishes a fixed obstacle, the exposed fixed obstacle shall be protected with a sand filled temporary crash cushion. The sand filled temporary crash cushion shall be in place prior to opening the lanes adjacent to the fixed obstacle to public traffic.

Sand filled temporary crash cushions shall be maintained in place at each location, including times when work is not actively in progress. Sand filled temporary crash cushions may be removed during a work period for access to the work provided that the exposed fixed obstacle is 15 feet or more from a lane carrying public traffic and the temporary crash cushion is reset to protect the obstacle prior to the end of the work period in which the fixed obstacle was exposed. When no longer required, as determined by the Engineer, sand filled temporary crash cushions shall be removed from the site of the work.

MATERIALS.--At the Contractor's option, the modules for use in sand filled temporary crash cushions shall be either Energite III Internal Modules, Fitch Internal Modules or Traffix Sand Barrels manufactured after March 31 1997, or equal:

1. Energite III and Fitch Inertial Modules, manufactured by Energy Absorption Systems, Inc., One East Wacker Drive, Chicago, IL 60601-2076, Telephone 1-312-467-6750, FAX 1-800-770-6755.

- A. Distributor (Northern): Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828, Telephone 1-800-884-8274, FAX 1-916-387-9734
 - B. Distributor (Southern): Traffic Control Service, Inc., 1881 Betmor Lane, Anaheim, CA 92805, Telephone 1-800-222-8274, FAX 1-714-937-1070.
2. Traffix Sand Barrels, manufactured by Traffix Devices, Inc., 220 Calle Pintoresco, San Clemente, CA 92672, Telephone 1-949-361-5663, FAX 1-949-361-9205.
- A. Russ Enterprises, Inc., 1533 Berger Drive, San Jose, CA 95112, Telephone 1-408-287-4303, FAX 1-408-287-1929.
 - B. Statewide Safety, P.O. Box 1440, Pismo Beach, CA 93448, Telephone 1-800-559-7080, FAX 1-805-929-5786.

Modules contained in each temporary crash cushion shall be of the same type at each location. The color of the modules shall be the standard yellow color, as furnished by the vendor, with black lids. The modules shall exhibit good workmanship free from structural flaws and objectionable surface defects. The modules need not be new. Good used undamaged modules conforming to color and quality of the types specified herein may be utilized. If used Fitch modules requiring a seal are furnished, the top edge of the seal shall be securely fastened to the wall of the module by a continuous strip of heavy duty tape.

Modules shall be filled with sand in conformance with the manufacturer's directions, and to the sand capacity in pounds for each module as shown on the plans. Sand for filling the modules shall be clean washed concrete sand of commercial quality. At the time of placing in the modules, the sand shall contain not more than 7 percent water as determined by California Test 226.

Modules damaged due to the Contractor's operations shall be repaired immediately by the Contractor at the Contractor's expense. Modules damaged beyond repair, as determined by the Engineer, due to the Contractor's operations shall be removed and replaced by the Contractor at the Contractor's expense.

INSTALLATION.--Temporary crash cushion modules shall be placed on movable pallets or frames conforming to the dimensions shown on the plans. The pallets or frames shall provide a full bearing base beneath the modules. The modules and supporting pallets or frames shall not be moved by sliding or skidding along the pavement or bridge deck.

A Type R or P marker panel shall be attached to the front of the crash cushion as shown on the plans, when the closest point of crash cushion array is within 12 feet of the traveled way. The marker panel, when required, shall be firmly fastened to the crash cushion with commercial quality hardware or by other methods determined by the Engineer.

At the completion of the project, temporary crash cushion modules, sand filling, pallets or frames, and marker panels shall become the property of the Contractor and shall be removed from the site of the work. Temporary crash cushion modules shall not be installed in the permanent work.

MEASUREMENT AND PAYMENT.--Temporary crash cushion modules will be measured by the unit determined from the actual count of modules used in the work or ordered by the Engineer at each location. Temporary crash cushion modules placed in conformance with the provisions in "Public Safety" of these special provisions and modules placed in excess of the number specified or shown will not be measured nor paid for.

Repairing modules damaged by public traffic will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Modules damaged beyond repair by public traffic, when ordered by the Engineer, shall be removed and replaced immediately by the Contractor. Modules replaced due to damage by public traffic will be measured and paid for as temporary crash cushion module.

If the Engineer orders a lateral move of the sand filled temporary crash cushions and the repositioning is not shown on the plans, moving the sand filled temporary crash cushion will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications and these temporary crash cushion modules will not be counted for payment in the new position.

The contract unit price paid for temporary crash cushion module shall include full compensation for furnishing all labor, materials (including sand, pallets or frames and marker panels), tools, equipment, and incidentals, and for doing all work involved in furnishing, installing, maintaining, moving, and resetting during a work period for access to the work, and removing from the site of the work when no longer required (including those damaged by public traffic) sand filled temporary crash cushion modules, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.27 EXISTING HIGHWAY FACILITIES

The work performed in connection with various existing highway facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

Delete the first paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

Existing facilities which are to remain in place shall be protected in conformance with the provisions in Sections 7-1.11, "Preservation of Property," and 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications and "Indemnification and Insurance," elsewhere in these special provisions.

Plans of the existing bridges may be requested by fax from the Division of Structure Maintenance and Investigations, 1801 30th Street, Sacramento, CA, Fax (916) 227-8357, and are available at the Office of Structure Maintenance and Investigations, Los Angeles, CA, Telephone (213) 897-6156.

Plans of the existing bridges available to the Contractor are reproductions of the original contract plans with significant changes noted and working drawings and do not necessarily show normal construction tolerances and variances. Where dimensions of new construction required by this contract are dependent on the dimensions of the existing bridges, the Contractor shall verify the controlling field dimensions and shall be responsible for adjusting dimensions of the work to fit existing conditions.

Attention is directed to Section 7-1.06, "Safety and Health Provisions," of the Standard Specifications. Work practices and worker health and safety shall conform to the California Division of Occupational Safety and Health Construction Safety Orders Title 8, of the California Code of Regulations including Section 5158, "Other Confined Space Operations."

The existing paint systems on Bridge Number 53-0867, 53-0660, and 53-0661 consist of lead paint. Any work that disturbs the existing paint system will expose workers to health hazards and will (1) produce debris containing heavy metal in amounts that exceed the thresholds established in Titles 8 and 22 of the California Code of Regulations or (2) produce toxic fumes when heated. All debris produced when the existing paint system is disturbed shall be contained.

Bridge Numbers 53-0660 and 53-0661 were full surface blasted and re-coated with vinyl primer and paint.

DEBRIS CONTAINMENT AND COLLECTION PROGRAM

Prior to starting work, the Contractor shall submit a debris containment and collection program to the Engineer in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, for debris produced when the existing paint system is disturbed. The program shall identify materials, equipment, and methods to be used when the existing paint system is disturbed and shall include working drawings of any containment system, loads applied to the bridge by any containment structure, and provisions for ventilation and air movement for visibility and worker safety.

If the measures being taken by the Contractor are inadequate to provide for the containment and collection of debris produced when the existing paint system is disturbed, the Engineer will direct the Contractor to revise the operations and the debris containment and collection program. The directions will be in writing and will specify the items of work for which the Contractor's debris containment and collection program are inadequate. No further work shall be performed on the items until the debris containment and collection programs are adequate and, if required, a revised program has been approved for the containment and collection of debris produced when the existing paint system is disturbed.

The Engineer will notify the Contractor of the approval or rejection of any submitted or revised debris containment and collection program within 2 weeks of submittal of the Contractor's program or revised program.

The State will not be liable to the Contractor for failure to approve all or any portion of an originally submitted or revised debris containment and collection program, nor for any delays to the work due to the Contractor's failure to submit acceptable programs.

SAFETY AND HEALTH PROVISIONS

Attention is directed to Section 7-1.06, "Safety and Health Provisions," of the Standard Specifications. Work practices and worker health and safety shall conform to the Construction Safety Orders Title 8, of the California Code of Regulations including Section 1532.1, "Lead."

The Contractor shall furnish the Engineer a written Code of Safe Practices, and have an Injury and Illness Prevention Program and a Hazard Communication Program in conformance with the provisions of Construction Safety Orders 1509 and 1510.

Prior to starting work that disturbs the existing paint system and at such times when revisions to the program are required by Section 1532.1, "Lead," the Contractor shall submit the compliance programs required in subsection (e)(2), "Compliance Program," of Section 1532.1, "Lead," of the Construction Safety Orders to the Engineer in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The compliance programs shall include the data specified in subsections (e)(2)(B) and (e)(2)(C) of Section 1532.1, "Lead." Approval of the compliance programs by the Engineer will not be required. The compliance programs shall be reviewed and signed by a Certified Industrial Hygienist (CIH) who is certified in comprehensive practice by the American Board of Industrial Hygiene (ABIH).

Copies of all air monitoring or jobsite inspection reports made by or under the direction of the CIH in conformance with Section 1532.1, "Lead," shall be furnished to the Engineer within 10 days after date of monitoring or inspection.

DEBRIS HANDLING

Debris produced when the existing paint system is disturbed shall not be temporarily stored on the ground. Debris accumulated inside the containment system shall be removed before the end of each work shift. Debris shall be stored in approved leak proof containers and shall be handled in such a manner that no spillage will occur.

Disposal of debris produced when the existing paint system is disturbed shall be performed in conformance with all applicable Federal, State and Local hazardous waste laws. Laws that govern this work include:

1. Health and Safety Code, Division 20, Chapter 6.5 (California Hazardous Waste Control Act).
2. Title 22; California Code of Regulations, Chapter 30 (Minimum Standard for Management of Hazardous and Extremely Hazardous Materials).
3. Title 8, California Code of Regulations.

Except as otherwise provided herein, debris produced when the existing paint system is disturbed shall be disposed of by the Contractor at an approved Class 1 disposal facility in conformance with the requirements of the disposal facility operator. The debris shall be hauled by a transporter currently registered with the California Department of Toxic Substances Control using correct manifesting procedures and vehicles displaying current certification of compliance. The Contractor shall make all arrangements with the operator of the disposal facility and perform any testing of the debris required by the operator.

At the option of the Contractor, the debris produced when the existing paint system is disturbed may be disposed of by the Contractor at a facility equipped to recycle the debris, subject to the following requirements:

Copper slag abrasive blended by the supplier with a calcium silicate compound shall be used for blast cleaning.

The debris produced when the existing paint system is disturbed shall be tested by the Contractor to confirm that the solubility of the heavy metals is below regulatory limits and that the debris may be transported to the recycling facility as a non-hazardous waste.

The Contractor shall make all arrangements with the operator of the recycling facility and perform any testing of the debris produced when the existing paint system is disturbed that is required by the operator.

WORK AREA MONITORING

The Contractor shall perform work area monitoring of the ambient air and soil in and around the work area at the East El Monte Overhead (Widening), Bridge No. 53-0867; Peck Road Undercrossing (Widening), Bridge Number 53-0661; and Valley Boulevard Undercrossing (Widening), Bridge Number 53-0660 bridge sites to verify the effectiveness of the containment system. The work area monitoring shall consist of collecting, analyzing, and reporting of air and soil test results and recommending any required corrective action when specified exposure levels are exceeded. The work area monitoring shall be carried out under the direction of a CIH. The samples shall be collected at locations designated by the Engineer.

Air samples shall be collected and analyzed in conformance with National Institute for Occupational Safety and Health (NIOSH) methods. Lead air samples shall be collected and analyzed in conformance with NIOSH Method 7082, with a limit of detection of at least 0.5 µg/m³. Air samples for other metals shall be collected and analyzed in conformance with NIOSH Method 7300, with a limit of detection of at least one percent of the appropriate Permissible Exposure Limits (PELs) of California/Occupational Safety and Health Administration (Cal/OSHA). Alternative methods of sample collection and analysis, with equivalent limits of detection, may be used at the option of the Contractor.

The airborne metals exposure, outside either the containment system or work areas, shall not exceed the lower of either: (1) 10 percent of the Action Level specified for lead by Section 1532.1, "Lead," or (2) 10 percent of the appropriate PELs specified for other metals by Cal/OSHA.

The air samples shall be collected at least once per week during progress of work that disturbs the existing paint system. All air samples shall be analyzed within 48 hours at a facility accredited by the Environmental Lead Laboratory Accreditation Program of the American Industrial Hygiene Association (AIHA). When corrective action is recommended by the CIH, additional samples may be required by the Engineer to be taken, at the Contractor's expense.

Soil samples shall be collected prior to the start of work, and within 36 hours following completion of cleaning operations of existing structural steel. Where the cleaning operations extend over large areas of soil or many separate areas of soil at each bridge site, the samples shall be collected at various times during the contract when determined by the Engineer. A soil sample shall consist of 5 plugs, each 3/4 inch diameter and 1/2 inch deep, taken at each corner and center of a one foot square area. Soil samples shall be analyzed for total lead in conformance with Method 3050 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846 published by the United States Environmental Protection Agency.

Structure	Samples Prior to Start of Work	Samples within 36 hours following cleaning
Peck Road Undercrossing (Widening) (53-0661) Location G	3	3
Valley Boulevard Undercrossing (Widening) (53-0660) Location H	3	3
East El Monte Overhead (Widening) (53-0867) Location I	6	6

There shall be no increase in the concentrations of heavy metal in the soil in the area affected when the existing paint system is disturbed. When soil sampling, after completion of work that disturbs the existing paint system, shows an increase in the concentrations of heavy metal, the area affected shall be cleaned and resampled at the Contractor's expense until soil sampling and testing shows concentrations of heavy metal less than or equal to the concentrations collected prior to start of work.

In areas where there is no exposed soil, there shall be no visible increase in the concentrations of heavy metal on the area affected when the existing paint system is disturbed. Any visible increase in the concentrations of heavy metal, after completion of work that disturbs the existing paint system, shall be removed at the Contractor's expense.

Air and soil sample laboratory analysis results, including results of additional samples taken after corrective action as recommended by the CIH, shall be submitted to the Engineer. The results shall be submitted both verbally within 48 hours after sampling and in writing with a copy to the Contractor, within 5 days after sampling. Sample analysis reports shall be prepared by the CIH as follows:

For both air and soil sample laboratory analysis results, the date and location of sample collection, sample number, contract number, bridge number, full name of the structure as shown on the contract plans, and District-County-Route-Post mile will be required.

For air sample laboratory analysis results, the following will be required:

1. List of emission control measures in place when air samples were taken.
2. Air sample results shall be compared to the appropriate PELs.
3. Chain of custody forms.
4. Corrective action recommended by the CIH to ensure airborne metals exposure, outside either the containment system or work areas, is within specified limits.

For soil sample laboratory analysis results, the concentrations of heavy metal expressed as parts per million will be required.

CONTAINMENT SYSTEM

The containment system shall consist of, at the option of the Contractor, (1) a ventilated containment structure, (2) vacuum shrouded surface preparation equipment and drapes, tarps or other materials, or (3) equivalent containment system. The containment system shall contain all water, resulting debris, and visible dust produced when the existing paint system is disturbed.

The containment system shall provide the minimum clearances as required under "Relations with Railroad Company" of these special provisions for the passage of railroad traffic.

The ventilated containment structure shall conform to the provisions for falsework in Section 51-1.06, "Falsework," of the Standard Specifications.

The minimum total design load of the ventilated containment structure shall consist of the sum of the dead and live vertical loads. Dead load shall consist of the actual load of the ventilated containment structure. Live loads shall consist of a uniform load of not less than 45 pounds per square foot, which includes 20 pounds per square foot of sand load, applied over the area supported, and in addition, a moving 1000 pound concentrated load shall be applied to produce maximum stress in the main supporting elements. Assumed horizontal loads need not be included in the design of the ventilated containment structure.

The ventilated containment structure shall be supported with either rigid or flexible supports. The rigid or flexible containment materials on the containment structure shall retain air borne particles but may allow air flow through the containment materials. Flexible materials shall be supported and fastened to prevent escape of abrasive and blast materials due to whipping from traffic or wind and to maintain the clearances.

All mating joints between the ventilated containment structure and the bridge shall be sealed. Sealing may be by overlapping of seams when using flexible materials or by using tape, caulking, or other sealing measures.

Multiple flap overlapping door tarps shall be used at entry ways to the ventilated containment structure to prevent dust or debris from escaping.

Baffles, louvers, flapper seals or ducts shall be used at make-up air entry points to the ventilated containment structure to prevent escape of abrasives and resulting surface preparation debris.

The ventilated containment structure shall be properly maintained while work is in progress and shall not be changed from the approved working drawings without prior approval of the Engineer.

The ventilation system in the ventilated containment structure shall be of the forced input air flow type with fans or blowers.

Negative air pressure shall be employed within the ventilated containment structure and will be verified by visual methods by observing the concave nature of the containment materials while taking into account wind effects, or by using smoke or other visible means to observe air flow. The input air flow shall be properly balanced with the exhaust capacity throughout the range of operations.

The exhaust air flow of the ventilation system in the ventilated containment structure shall be forced into dust collectors (wet or dry) or bag houses.

PROTECTIVE WORK CLOTHING AND HYGIENE FACILITIES

Wherever there is exposure or possible exposure to heavy metals or silica dust at the bridge site, the Contractor shall, for not more than 3 State personnel: (1) furnish, clean and replace protective work clothing and (2) provide access to hygiene facilities. The furnishing, cleaning, and replacement of protective work clothing and hygiene facilities shall conform to the provisions of subsections (g), "Protective work clothing and equipment," and (i), "Hygiene facilities and practices," of Section 1532.1, "Lead," of the Construction Safety Orders.

The protective work clothing and access to hygiene facilities shall be provided during exposure or possible exposure to heavy metals or silica dust at the bridge site and application of the undercoats of paint.

Protective work clothing and hygiene facilities shall be inspected and approved by the Engineer before being used by State personnel.

The protective work clothing shall remain the property of the Contractor at the completion of the contract.

PAYMENT

Full compensation for the containment system, protective work clothing and access to hygiene facilities for State personnel, and handling of debris produced when the existing paint system is disturbed, including testing, hauling, treatment, disposal fees and local taxes, shall be considered as included in the contract price paid for the item of work requiring the disposal of the debris produced when the existing paint system is disturbed and no additional compensation will be allowed therefor.

Work area monitoring will be paid for on the basis of a lump sum price.

The contract lump sum price paid for work area monitoring shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in collecting and analyzing of samples of ambient air and soil for heavy metals, complete in place, including reporting the test results, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.27A ABANDON CULVERT

Existing culverts, where shown on the plans to be abandoned, shall be abandoned in place or, at the option of the Contractor, the culverts shall be removed and disposed of. Resulting openings into existing structures that are to remain in place shall be plugged with commercial quality concrete containing not less than 500 pounds of cement per cubic yard.

Abandoning culverts in place shall conform to the following:

Culverts that intersect the side slopes shall be removed to a depth of not less than 3 feet measured normal to the plane of the finished side slope, before being abandoned.

Culverts 12 inches in diameter and larger, shall, at the Contractor's option, be backfilled with either sand, controlled low strength material or slurry cement backfill conforming to the provisions in Section 19-3.062, "Slurry Cement Backfill," of the Standard Specifications by any method acceptable to the Engineer that completely fills the pipe. Sand backfill material shall be clean, free draining, and free from roots and other deleterious substances.

The ends of culverts shall be securely closed by a 0.5-foot thick tight fitting plug or wall of commercial quality concrete.

Culverts shall not be abandoned until their use is no longer required. The Contractor shall notify the Engineer in advance of any intended culvert abandonment.

If the Contractor elects to remove and dispose of any culvert which is specified to be abandoned, as provided herein, any sand backfill specified for such pipe will be measured and paid for in the same manner as if the culvert has been abandoned in place.

Backfill will be measured by the cubic yard determined from the dimensions of the culverts to be abandoned.

The contract price paid per cubic yard for sand backfill shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in backfilling culverts with sand, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Controlled low strength material and slurry cement backfill, if used at the Contractor's option, will be measured and paid for by the cubic yard as sand backfill.

Full compensation for concrete plugs, pipe removal, structure excavation, and backfill shall be considered as included in the contract unit price paid for abandon culvert and no additional compensation will be allowed therefor.

10-1.27B ABANDON INLET

Existing concrete drainage inlets where shown on the plans to be abandoned, shall be abandoned.

The top portion of the inlets shall be removed to a depth of 3 feet below finished grade.

Removed frames and grates shall be disposed of.

10-1.27C REMOVE METAL BEAM GUARD RAILING

Existing metal beam guard railing, where shown on the plans to be removed, shall be removed and disposed of.

Existing concrete anchors shall be completely removed and disposed of. Full compensation for removing concrete anchors shall be considered as included in the contract price paid per linear foot for remove metal beam guard railing and no separate payment will be made therefor.

Full compensation for removing cable anchor assemblies and terminal anchor assemblies shall be considered as included in the contract price paid per linear foot for remove metal beam guard railing and no separate payment will be made therefor.

10-1.27D REMOVE CHAIN LINK FENCE

Existing chain link fence, where shown on the plans to be removed, shall be removed and disposed of.

Existing concrete foundations shall be completely removed and disposed of. Full compensation for removing concrete foundations shall be considered as included in the contract price paid per linear foot for remove chain link fence and no separate payment will be made therefor.

10-1.27E RESET PROPERTY FENCE

Existing wrought iron property fences, including attached razor wire, shall be removed and reset in conformance with the details shown on the plans, these special provisions and as directed by the Engineer.

The wrought iron property fence shall be removed prior to construction of Retaining Wall No. 58.

When construction is complete, the wrought iron property fences shall be installed in the final position.

Existing footings shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Full compensation for disposing of existing footings and for furnishing new footings shall be considered as included in the contract unit price paid for reset property fence and no additional compensation will be allowed therefor.

10-1.27F REMOVE SIGN STRUCTURE

Existing sign structures, where shown on the plans to be removed, shall be removed and disposed of.

Overhead sign structure removal shall consist of removing posts, frames, portions of foundations, sign panels, walkways with safety railings, and sign lighting electrical equipment.

Bridge mounted sign removal shall consist of removing sign panels and frames, sign lighting electrical equipment, walkways with safety railings, structural braces and supports, and hardware.

A sign structure shall not be removed until the structure is no longer required for the direction of public traffic.

Concrete foundations may be abandoned in place, except that the top portion, including anchor bolts, reinforcing steel, and conduits shall be removed to a depth of not less than 3 feet below the adjacent finished grade. The resulting holes shall be backfilled and compacted with material equivalent to the surrounding material.

Electrical wiring shall be removed to the nearest pull box. Fuses within spliced connections in the pull box shall be removed and disposed of.

Electrical equipment, where shown on the plans, shall be salvaged. Salvaged electrical materials shall be hauled to the Department of Transportation Recycling Center at 1698 West Mission Boulevard, Pomona, CA 91766 and stockpiled. The Contractor shall provide the equipment, as necessary, to safely unload and stockpile the material. The Contractor shall call the Recycling Center at Telephone No. (909) 629-3577 a minimum of 2 working days before delivery.

10-1.27G REMOVE PAVEMENT MARKER

Existing pavement markers, including underlying adhesive, when no longer required for traffic lane delineation as determined by the Engineer, shall be removed and disposed of.

Delete the first paragraph of Section 15-2.02C, "Pavement Markers," of the Standard Specifications.

Pavement markers, including underlying adhesive, shall be removed by such methods that will cause the least possible damage to the pavement or surfacing. Damage to the pavement or surfacing caused by pavement marker removal shall be repaired by the Contractor at the Contractor's expense by methods acceptable to the Engineer.

10-1.27H REMOVE TRAFFIC STRIPE

Traffic stripes to be removed shall be removed at the locations shown on the plans and at the locations designated by the Engineer.

Where blast cleaning is used for the removal of painted traffic stripes and pavement markings or for removal of objectionable material, and such removal operation is being performed within 10 feet of a lane occupied by public traffic, the residue including dust shall be removed immediately after contact between the sand and the surface being treated. Such removal shall be by a vacuum attachment operating concurrently with the blast cleaning operation.

Nothing in these special provisions shall relieve the Contractor from his responsibilities as provided in Section 7-1.09, "Public Safety," of the Standard Specifications.

Delete the first paragraph of Section 15-2.02B, "Traffic Stripes and Pavement Markings," of the Standard Specifications.

Traffic stripes shall be removed by any method that does not materially damage the existing pavement. Residue resulting from removal operations shall be removed from pavement surfaces by sweeping or vacuuming before the residue is blown by the action of traffic or wind, migrates across lanes or shoulders, or enters into drainage facilities.

Attention is directed to "Water Pollution Control" of these special provisions.

Yellow thermoplastic and yellow painted traffic stripes may contain lead and chromium. Residue produced when yellow thermoplastic and yellow paint are removed may contain heavy metals in concentrations that exceed hazardous waste thresholds established by the California Code of Regulations and may produce toxic fumes when heated.

The removed yellow thermoplastic and yellow paint material shall be disposed of at a Class 1 disposal facility in conformance with the requirements of the disposal facility operator within 90 days after accumulating 220 lb of residue and dust. The Contractor shall make necessary arrangements with the operator of the disposal facility and perform required testing of the yellow thermoplastic and yellow paint residue required by the operator. The Contractor shall submit the name and location of the disposal facility along with testing requirements to the Engineer not less than 21 days prior to the start of removal of yellow thermoplastic and yellow painted traffic stripes and pavement markings.

At least 21 days prior to the start of removal operations of yellow thermoplastic and yellow painted traffic stripes, the Contractor shall submit the written compliance programs required in Subsection (e)(2), "Compliance Program," of Section 1532.1, "Lead," of the Construction Safety Orders to the Engineer. The compliance programs shall be prepared by an industrial hygienist certified by the American Board of Industrial Hygiene and shall cover all Contractor employees removing or handling the yellow thermoplastic and yellow paint residue. Inspection reports shall be made in conformance with the requirements in Section 1532.1 and shall be submitted to the Engineer.

Prior to performing yellow thermoplastic and yellow painted traffic stripe removal, personnel who have no prior lead training, including State personnel, shall complete a safety training class provided by the Contractor. The training shall conform to the requirements in Section 1532.1. The number of State personnel to be trained shall not exceed 3.

Where grinding or other methods approved by the Engineer are used to remove yellow thermoplastic and yellow painted traffic stripes, the removal residue including dust, shall be contained and collected immediately. Sweeping equipment shall not be used. Collection shall be by a High Efficiency Particulate Air (HEPA) vacuum attachment operated concurrently with the removal operations or other equally effective methods as approved by the Engineer. The Contractor shall submit a written work-plan for the removal, storage, and disposal of yellow thermoplastic and yellow

painted traffic stripes and pavement markings to the Engineer for approval not less than 21 days prior to the start of the removal operations.

The collected yellow thermoplastic and yellow paint removal residue shall be stored and labeled in covered containers. The containers shall be a type as approved by the United States Department of Transportation for the transportation and temporary storage of the removal residue. The containers shall be handled in a manner that no spillage will occur. The containers shall be stored in a secured enclosure at a location within the project limits, as approved by the Engineer, until disposal.

The collected yellow thermoplastic and yellow paint removal residue shall be transported to a Class 1 disposal facility, using manifesting procedures, by a transporter registered with the California Department of Toxic Substance Control. The Engineer will obtain the United States Environmental Protection Agency Identification Number and sign all manifests as the generator.

The Contractor shall assume that the yellow thermoplastic and yellow paint removal residue is not regulated under the Federal Resource Conservation and Recovery Act (RCRA). Additional disposal costs for removal residue regulated under RCRA, as determined by test results required by the disposal facility, will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Nothing in these special provisions shall relieve the Contractor of the Contractor's responsibilities as specified in Section 7-1.09, "Public Safety," of the Standard Specifications.

Except as otherwise provided, the contract price paid per linear foot for remove yellow painted traffic stripe shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in the removal and disposal of yellow painted traffic stripes, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.27I REMOVE DRAINAGE FACILITIES

Existing inlets, headwalls, junction structures, outlet structures, rock slope protection, pipe culverts, cleanouts, asphalt concrete overside drains, flared end sections and headwalls, where shown on the plans to be removed, shall be completely removed and disposed of.

Existing drainage facilities shall not be removed until their use is no longer required. The Contractor shall notify the Engineer a minimum of 2 working days prior to any drainage facility removal.

The ends of existing pipe culverts to remain in place shall be plugged with a 0.5-foot thick commercial quality concrete, containing not less than 500 pounds of cement per cubic yard.

Drainage facilities removed shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Remove cleanout will be measured and paid for as remove inlet.

Remove junction structure and outlet structure will be measured and paid for as remove concrete (drainage structure).

Full compensation for furnishing and placing concrete plugs at the ends of existing pipe culverts to remain in place shall be considered as included in the contract price paid per linear foot for remove culvert and no separate payment will be made therefor.

10-1.27J ABANDON DRAINAGE FACILITIES

Existing sidewalk culverts, where shown on the plans to be abandoned, shall be abandoned.

Existing sidewalk culverts shall not be abandoned until their use is no longer required. The Contractor shall notify the Engineer a minimum of 2 working days prior to any drainage facility abandonment.

10-1.27K REMOVE ROADSIDE SIGN

Existing roadside signs, at those locations shown on the plans to be removed, shall be removed and disposed of.

Existing roadside signs shall not be removed until replacement signs have been installed or until the existing signs are no longer required for the direction of public traffic, unless otherwise directed by the Engineer.

10-1.27L REMOVE RETAINING WALL

Existing reinforced concrete retaining walls, at those locations shown on the plans to be removed, shall be removed and disposed of.

Plans of existing retaining walls are available for inspection at District 7, Office of Construction, Construction Administration Branch, 120 South Spring Street, Los Angeles, California 90012, Telephone: (213) 897-3656.

Plans of existing retaining walls available for inspection are reproductions of the original contract plans and may contain significant changes noted, include working drawings and do not necessarily show normal construction tolerances and variances.

Removing existing reinforced concrete retaining walls may involve cutting off, removal and disposal of portions of existing pile foundations.

Existing cable railing mounted on top of retaining walls to be removed shall be removed and disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13 of the Standard Specifications.

Remove retaining wall, except retaining walls identified as part of bridge removals, will be measured and paid for by the square yard, measured vertically from the bottom of footing to the top of wall, regardless of footing width, before and during removal operations.

Concrete removed shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13 of the Standard Specifications.

The contract price paid per square yard for remove retaining wall shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in remove retaining wall, including excavation and backfill, removing and disposing of cable railing and cutting off, removing and disposing of pile foundations, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.27M REMOVE SOUND WALL

Existing masonry block sound walls, at those locations shown on the plans to be removed, shall be removed and disposed of.

Where partial removal of sound walls is necessary to join new sound walls, existing reinforcement that is to be incorporated in new work shall be protected from damage and shall be thoroughly cleaned of all adhering material before being spliced or incorporated in the new work. Care shall be taken to not damage existing concrete barrier supports.

Before beginning removal operations, the outline of the area to be removed shall be cut on a neat line with a power-driven saw to a minimum depth of one inch on all faces of the sound wall which will be visible in the completed work.

Removing sound wall will be measured and paid for by the square yard, measured along the face of the sound wall from the lowermost element of the sound wall to the top of the sound wall before removal operations.

Sound walls removed shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13 of the Standard Specifications.

The contract price paid per square yard for remove sound wall shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in remove sound wall, including sawcutting, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.27N RECONSTRUCT ELECTROLIERS

Reconstructing electroliers shall consist of removing and reconstructing existing electroliers and furnishing and installing new conduits, conductors and pull boxes required to restore electric power supply at new locations as shown on the plans.

Each existing concrete foundation including anchor bolts, reinforcing steel, and conduit shall be removed to a depth of not less than 3 feet below the adjacent finished grade. Electrical wiring, if any, shall be removed to the nearest pull box. Removed portions of concrete foundations shall be disposed of.

New conduits, conductors and wiring and pull boxes for reconstruct electrolier shall conform to the provisions of Section 10-3, "Signals, Lighting and Electrical Systems" of the Standard Specifications and these special provisions.

New foundation work for reconstructed sign structures shall conform to the provisions in Section 56-1, "Overhead Sign Structures," of the Standard Specifications.

New foundations for reconstruct electroliers shall conform to the requirements for new sign structures in Section 86-2.03, "Foundations," of the Standard specifications.

Full compensation for reconstruct electrolier shall be considered as included in the contract lump sum price paid for lighting and sign illumination system and no separate payment will be made therefor.

10-1.27O RECONSTRUCT CHAIN LINK FENCE

Existing chain link fence shall be removed and reconstructed as shown on the plans.

Fence removed in excess of that required for reconstructing chain link fence shall be disposed of. Full compensation for removing and disposing of excess fence shall be considered as included in the contract price paid per linear foot for reconstruct chain link fence and no separate payment will be made therefor.

10-1.27P RECONSTRUCT METAL BEAM GUARD RAILING

Existing metal beam guard railing, where shown on the plans to be reconstructed, shall be reconstructed.

Attention is directed to "Order of Work" of these special provisions regarding the reconstruction of guard railing at those locations exposed to public traffic.

Cable anchor assemblies or terminal anchor assemblies, including concrete anchors and steel foundation tubes, shall be completely removed and disposed of.

Existing metal beam guard railing to be reconstructed shall be disassembled by removing the rail elements, end sections, terminal sections, and return sections from the posts and blocks. Posts and blocks shall be removed completely and concrete anchors shall be removed to a depth of not less than one foot below the adjacent finished grade.

New posts and blocks shall be furnished and used to reconstruct metal beam guard railing. New posts and blocks shall conform to the provisions in Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications.

Posts, blocks, and other components of the removed metal beam guard railing, including terminal sections, that are not used in the reconstruction work shall be disposed of.

Full compensation for furnishing and installing additional new posts, blocks, and hardware; and for removing and disposing of cable anchor assemblies shall be considered as included in the contract price paid per linear foot for reconstruct metal beam guard railing and no separate payment will be made therefor.

10-1.27Q RESET ROADSIDE SIGNS

Existing roadside signs, where shown on the plans to be reset, shall be removed and reset.

Each roadside sign shall be reset on the same day said sign is removed. In the event that a roadside sign cannot be reset at its final location on the same day it is removed, the sign shall be set at a temporary location as directed by the Engineer.

Reset roadside signs shall be installed on new posts conforming to the provisions in Section 56-2.02B, "Wood Posts," of the Standard Specifications.

Full compensation for furnishing new posts shall be considered as included in the contract unit price paid for reset roadside sign and no additional compensation will be allowed therefor.

Full compensation for resetting roadside signs at temporary locations shall be considered as included in the contract unit price paid for reset roadside sign and no separate payment will be made therefor.

10-1.27R RELOCATE SIGN PANEL (BRIDGE-MOUNTED)

Relocating sign panels (bridge-mounted) shall consist of removing and relocating existing sign panels (bridge-mounted) as shown on the plans.

10-1.27S RELOCATE ROADSIDE SIGNS

Existing roadside signs shall be removed and relocated at new locations shown on the plans.

Each roadside sign shall be installed at the new location on the same day said sign is removed from its original location.

Relocated roadside signs shall be installed on new posts conforming to the provisions in Section 56-2.02B, "Wood Posts," of the Standard Specifications.

Full compensation for furnishing new posts shall be considered as included in the contract unit price paid for relocate roadside sign and no additional compensation will be allowed therefor.

10-1.27T ADJUST INLET

Existing pipe inlets and concrete drainage inlets shall be adjusted as shown on the plans.

Portland cement concrete shall be minor concrete or may be produced from commercial quality concrete containing not less than 590 pounds of cement per cubic yard.

Adjustment of inlets shall be performed prior to paving and shall be limited to the area to be paved or resurfaced during the working day in which such adjustment is performed. The top of the inlet grate or cover shall be adequately protected from the asphalt concrete during paving operations by means of plywood covers or by other methods approved by the Engineer. Excess paving material shall be removed prior to rolling.

10-1.27U REMOVE PORTLAND CEMENT CONCRETE PAVEMENT

Removing portland cement concrete pavement shall conform to the provisions in Section 15-3, "Removing Concrete," of the Standard Specifications and these special provisions.

Where no joint exists in the pavement on the line at which concrete is to be removed, a straight, neat cut with a power-driven saw shall be made along said line to a minimum depth of 0.17-foot before removing concrete.

The quantities of portland cement concrete pavement removed will be measured and paid for by the square yard.

No deduction will be made from any excavation quantities for the quantity of portland cement concrete pavement removed.

Full compensation for removing bituminous or other overlying material and sawing joints at removal lines, as required, shall be considered as included in the contract price paid per square yard for remove concrete pavement and no additional compensation will be allowed therefor.

10-1.27V COLD PLANE ASPHALT CONCRETE PAVEMENT

Existing asphalt concrete pavement shall be cold planed at the locations and to the dimensions shown on the plans.

Planing asphalt concrete pavement shall be performed by the cold planing method. Planing of the asphalt concrete pavement shall not be done by the heater planing method.

Cold planing machines shall be equipped with a cutter head not less than 30 inches in width and shall be operated so that no fumes or smoke will be produced. The cold planing machine shall plane the pavement without requiring the use of a heating device to soften the pavement during or prior to the planing operation.

The depth, width and shape of the cut shall be as shown on the typical cross sections or as designated by the Engineer. The final cut shall result in a uniform surface conforming to the typical cross sections. The outside lines of the planed area shall be neat and uniform. Planing asphalt concrete pavement operations shall be performed without damage to the surfacing to remain in place.

Planed widths of pavement shall be continuous except for intersections at cross streets where the planing shall be carried around the corners and through the conform lines. Following planing operations, a drop-off of more than 0.15-foot will not be allowed between adjacent lanes open to public traffic.

Where transverse joints are planed in the pavement at conform lines no drop-off shall remain between the existing pavement and the planed area when the pavement is opened to public traffic. If asphalt concrete has not been placed to the level of existing pavement before the pavement is to be opened to public traffic a temporary asphalt concrete taper shall be constructed. Asphalt concrete for temporary tapers shall be placed to the level of the existing pavement and tapered on a slope of 30:1 (Vertical:Horizontal) or flatter to the level of the planed area.

Asphalt concrete for temporary tapers shall be commercial quality and may be spread and compacted by any method that will produce a smooth riding surface. Temporary asphalt concrete tapers shall be completely removed, including the removal of loose material from the underlying surface, before placing the permanent surfacing. The removed material shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Operations shall be scheduled so that not more than 7 days shall elapse between the time when transverse joints are planed in the pavement at the conform lines and the permanent surfacing is placed at the conform lines.

The material planed from the roadway surface, including material deposited in existing gutters or on the adjacent traveled way, shall be removed and disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. Removal operations of cold planed material shall be concurrent with planing operations and follow within 50 feet of the planer, unless otherwise directed by the Engineer.

Cold plane asphalt concrete pavement will be measured by the square yard. The quantity to be paid for will be the actual area of surface cold planed irrespective of the number of passes required to obtain the depth shown on the plans.

The contract price paid per square yard for cold plane asphalt concrete pavement shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in cold planing asphalt concrete surfacing and disposing of planed material, including furnishing the asphalt concrete for and constructing, maintaining, removing, and disposing of temporary asphalt concrete tapers, as specified in the Standard Specifications, these special provisions and as directed by the Engineer.

10-1.27W CAP INLET

Existing pipe inlets and concrete drainage inlets, where shown on the plans to be capped, shall be capped and the bottoms of the inlets shall be rounded with portland cement concrete as shown on the plans.

Portland cement concrete shall be minor concrete or may be produced from commercial quality aggregates and cement containing not less than 564 pounds of cement per cubic yard.

Inlets shall be removed to the depth shown on the plans.

Concrete removal shall be performed without damage to portions of the inlet that are to remain in place. Damage to existing concrete, which is to remain in place, shall be repaired by the Contractor to a condition equal to that existing prior to the beginning of removal operations. The repair of existing concrete damaged by the Contractor's operations shall be at the Contractor's expense.

Existing reinforcement that is to be incorporated in the new work shall be protected from damage and shall be thoroughly cleaned of adhering material before being embedded in the new concrete.

The quantity of capping inlets will be determined as units from actual count.

The contract unit price paid for cap inlet shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in capping inlets, including removing portions of inlets, rounding bottoms of inlets, bar reinforcing steel, and structure excavation and structure backfill, as shown on the plans, as specified in the Standard Specifications and these special provisions and as directed by the Engineer.

10-1.27X BRIDGE REMOVAL

Removing portions of bridges shall conform to the provisions in Section 15-4, "Bridge Removal," of the Standard Specifications and these special provisions.

Location A
Rio Hondo Bridge (Widen)
(Bridge No. 53-0657)

Removal of portions of existing traffic operating system, wingwalls, overhangs, curbs, barriers, concrete channel, metal bridge railings, retaining walls, and diaphragms as shown on the plans.

Location B
Santa Anita Undercrossing (Widen)
(Bridge No. 53-0658)

Removal of portions of existing traffic operating system, wingwalls, overhangs, curbs, barriers, metal bridge railings, and abutments as shown on the plans.

Location C
Lexington Avenue Undercrossing (Widen)
(Bridge No. 53-0883)

Removal of portions of existing traffic operating system, wingwalls, overhangs, curbs, barriers, metal bridge railings, abutments, retaining walls, footings and soundwalls as shown on the plans.

Location D
Tyler Avenue Undercrossing (Widen)
(Bridge No. 53-0659)

Removal of portions of existing traffic operating system, wingwalls, overhangs, curbs, barriers, metal bridge railings and abutments as shown on the plans.

Location E
Utah Avenue Pedestrian Undercrossing (Widen)
(Bridge No. 53-1028)

Removal of portions of existing traffic operating system, box culvert and wingwalls as shown on the plans.

Location F
Meeker Road Undercrossing (Widen)
(Bridge No. 53-1029)

Removal of portions of existing traffic operating system, wingwalls, overhangs, curbs, barriers, metal bridge railings and abutments as shown on the plans.

Location G
Peck Road Undercrossing (Widen)
(Bridge No. 53-0661)

Removal of portions of existing traffic operating system, wingwalls, overhangs, curbs, barriers, metal bridge railings, and abutments, and removal of steel channel diaphragms, as shown on the plans,

Location H
Valley Boulevard Undercrossing (Widen)
(Bridge No. 53-0660)

Removal of portions of existing traffic operating system, wingwalls, overhangs, curbs, barriers, metal bridge railings, abutments, electroliers, and removal of steel channel diaphragms, as shown on the plans.

Location I
East El Monte Overhead (Widen)
(Bridge No. 53-0867)

Removal of portions of existing traffic operating system, wingwalls, overhangs, curbs, barriers, metal bridge railings, abutments, counterforts, retaining walls, footings and tops of piling as shown on the plans.

Location J
Stewart Street On-Ramp Undercrossing (Widen)
(Bridge No. 53-1030)

Removal of portions of existing traffic operating system, slabs, parapets, retaining walls, footings and tops of piling as shown on the plans.

Location K
Cogswell Road Undercrossing (Widen)
(Bridge No. 53-0662)

Removal of portions of existing traffic operating system, wingwalls, overhangs, curbs, barriers, metal bridge railings and abutments as shown on the plans.

Location L
Durfee Avenue Undercrossing (Widen)
(Bridge No. 53-1031)

Removal of portions of existing traffic operating system, wingwalls, overhangs, curbs, barriers, metal bridge railings and abutments as shown on the plans.

Location M
Garvey Avenue Off-Ramp Undercrossing (Widen)
(Bridge No. 53-1032)

Removal of portions of existing traffic operating system, wingwalls, overhangs, curbs, barriers, metal bridge railings, abutments, superstructure, retaining walls, footings, and tops of piling as shown on the plans.

Location N
San Gabriel River Bridge (Widen)
(Bridge No. 53-0109)

Removal of portions of existing traffic operating system, wingwalls, overhangs, curbs, barriers, metal bridge railings, deck slabs, abutments, paving notch extensions, diaphragms, seat extenders, retaining walls, footings, tops of piling, piles, approach slabs and slope paving as shown on the plans.

The second paragraph in Section 15-4.02, "Removal Methods," of the Standard Specifications is amended to read:

Materials that are to be salvaged shall be salvaged in the same manner specified for salvaging miscellaneous highway facilities in Section 15-2.04, "Salvage," of the Standard Specifications.

The following additional requirements apply to the removal of portions of bridges that are over or adjacent to roadways that may be closed to public traffic for only brief periods of time:

The closure of roadways to public traffic shall conform to the requirements under "Order of Work" and "Maintaining Traffic" of these special provisions.

Prior to closing a roadway to traffic to accommodate bridge removal operations, the Contractor shall have all necessary workers, materials and equipment at the site as needed to proceed with the removal work in an expeditious manner. While the roadway is closed to public traffic, work shall be pursued promptly and without interruption until the roadway is reopened to public traffic.

All removal operations shall be performed during periods of time that the roadway is closed to public traffic except as specified herein for preliminary work.

Preliminary work shall be limited to operations that will not reduce the structural strength or stability of the bridge, or any element thereof, to a level which in the judgment of the Engineer would constitute a hazard to the public. This preliminary work shall also be limited to operations that cannot cause debris or any other material to fall onto the roadway. Protective covers may be used to perform preliminary work such as chipping or cutting the superstructure into segments, provided the covers are of sufficient strength to support all loads and are sufficiently tight to prevent dust and fine material from sifting down onto the traveled way. Protective cover shall extend at least 4 feet beyond the limit of the work underway. Bottom slabs of box girders may be considered to be protective covers for preliminary work performed on the top slab inside the limits of the exterior girders.

Temporary support shoring and temporary bracing shall be used in conjunction with preliminary work when necessary to insure the stability of the bridge.

Temporary support shoring, temporary bracing, and protective covers as required, shall be designed and constructed in conformance with the provisions in Section 51-1.06, "Falsework," of the Standard Specifications.

Temporary support shoring, temporary bracing, and protective covers shall not encroach closer than 8 feet horizontally from the edge or 15 feet vertically above any traffic lane or shoulder that is open to public traffic.

During periods when the roadway is closed to public traffic, debris from bridge removal operations may be allowed to fall directly onto the lower roadway provided adequate protection is furnished for all highway facilities. The minimum protection for paved areas shall be a 2 foot thick earthen pad or a 1 inch thick steel plate placed over the area where debris can fall. Prior to reopening the roadway to public traffic, all debris, protective pads and devices shall be removed and the roadway swept clean with wet power sweepers or equivalent methods.

The removal operations shall be conducted in such a manner that the portion of the structure not yet removed remains in a stable condition at all times.

The following additional requirements apply to the removal of portions of bridges whenever the removal work is to be performed over public traffic or railroad property:

A protective cover supported by falsework or members of the existing structure shall be constructed before beginning bridge removal work.

The construction and removal of the protective cover and the installation and removal of temporary railings shall conform to the requirements under "Order of Work" "Maintaining Traffic" and "Temporary Railings" of these special provisions.

The protective cover shall prevent any materials, equipment, or debris from falling onto the public traffic or railroad property. The protective cover shall have a minimum strength equivalent to that provided by good, sound Douglas fir planking having a nominal thickness of 2 inches. Additional layers of material shall be furnished as necessary to prevent fine materials or debris from sifting down upon the traveled way and shoulders.

The protective cover shall conform to the provisions for falsework in Section 51-1.06, "Falsework," of the Standard Specifications.

The Contractor shall be responsible for designing and constructing a safe and adequate protective cover, and shoring and falsework needed to support the protective cover, all with sufficient strength and rigidity to support the entire load to be imposed.

Bridge removal methods shall be described in the working drawings and calculations in sufficient detail to substantiate live loads used in the protective cover design. Dead and live load values assumed for designing the protective cover shall be shown on the working drawings.

At locations where the bridge railing is to be removed, the protective cover shall extend from the face of exterior girder or at least 2 feet inside of the bridge railing to be removed, whichever is less, to at least 4 feet beyond the outside face of the bridge railing.

The protective cover shall extend at least 10 feet beyond the outside face of the bridge railing, except that, at locations where the bridge railing is to be removed and new girders are not constructed, the protective cover shall extend from the face of exterior girder or at least 2 feet inside of the bridge railing to be removed, whichever is less, to at least 4 feet beyond the outside face of the bridge railing.

During the removal of bridge segments, and when portions of the bridge, such as deck slabs or box girder slabs, comply with the requirements for the protective cover, a separate protective cover need not be constructed.

Before removal, the protective cover shall be cleaned of all debris and fine material.

The protective cover shall provide the openings specified under "Maintaining Traffic" of these special provisions, except that when no openings are specified for bridge removal a vertical opening of 15 feet and a horizontal opening of 32 feet shall be provided for the passage of public traffic.

The protective cover shall provide the minimum clearances as required under "Relations with Railroad Company" of these special provisions for the passage of railroad traffic.

Falsework or supports for protective cover shall not extend below the vertical clearance level nor to the ground line at any location within the roadbed.

The construction of the protective cover as specified herein shall not relieve the Contractor of responsibilities specified in Section 7-1.12, "Responsibility for Damage," of the Standard Specifications and these special provisions.

Coating exposed face of reinforcement, where shown on the plans, shall be coated with 2 applications of zinc-rich primer in the same manner as specified for exposed ends of prestressing steel in Section 50-1.05, "Prestressing Steel," of the Standard Specifications.

Full compensation for replacing slope paving at San Gabriel River Bridge (Widen) shall be included in the contract lump sum price paid for bridge removal (portion), location N and no additional compensation will be allowed therefor.

Existing footing concrete which is below ground and outside of the footing limits shown on the contract plans or original contract plans shall be removed as directed by the Engineer and such work will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

Full compensation for cutting reinforcing steel below the concrete cut line and filling holes with grout, as shown on the plans, shall be considered as included in the contract lump sum price paid for bridge removal (portion) and no additional compensation will be allowed therefor.

Full compensation for coating exposed ends of reinforcement, as shown on the plans, shall be considered as included in the contract lump sum price paid for bridge removal (portion) and no additional compensation will be allowed therefor.

10-1.27Y RECONSTRUCT PEDESTRIAN BARRIER

Pedestrian barrier where shown on the plans to be reconstructed shall be removed, temporarily stored, and installed in accordance with the details shown on the plans and as directed by the Engineer.

The Contractor shall temporarily store the removed barrier at a location approved by the Engineer, until such time that its re-installation is required.

Portland cement concrete for barrier post footing shall be commercial quality concrete containing not less than 470 pounds of cement per cubic yard.

Abraded and damaged surfaces on the removed material due to the Contractor's operations shall be repaired and restored equal to or better than its original condition.

Reconstruct pedestrian barrier will be measured and paid for by the unit of the actual pedestrian barrier units reconstructed in place.

10-1.27Z ACCESS OPENING, SOFFIT

Access opening, soffit, shall consist of removing portions of existing box girder bridge soffits at the locations and to the dimensions shown on the plans.

A 3/4 inch deep saw cut shall be made around the perimeter of soffit areas to be removed.

Bar reinforcing steel shall be removed as shown on the plans. The ends of the remaining bars shall be coated with 2 applications of zinc-rich primer in the same manner as specified for exposed ends of prestressing steel in Section 50-1.05, "Prestressing Steel," of the Standard Specifications.

Within a cell where work is to be performed, any existing formwork and miscellaneous concrete that will interfere with the work shall be removed. In addition, when the work is to be done in a cell that adjoins a hinge, all existing forms and sharp projections in the cell between the hinge and 5 feet past the access opening shall be removed.

All material removed shall become the property of the Contractor and shall be disposed of away from the site as provided in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

When no longer required, soffit access openings shall be closed as shown on the plans. All materials, including galvanized sheet metal covers, steel hardware, hinges and corrosion resistant concrete expansion anchorage devices, shall be commercial quality.

An approved thread locking system, consisting of a cleaner, primer and anaerobic adhesive, shall be applied where shown on the plans. Lubricants and foreign materials shall be removed from the threaded areas of both parts using the

cleaner and small wire brush. The primer shall be applied to cover the threaded areas of both parts. The anaerobic adhesive shall be applied to fill the male threads in the area of the final position of the nut. The nut shall be installed at the location or to the torque shown on the plans, and an additional fillet of anaerobic adhesive shall be applied completely around the exposed junctions of the nut and male part.

Unless specified as an option, using deck access openings in lieu of soffit access openings will not be allowed.

Access openings through soffits will be measured and paid for by the unit as access opening, soffit. Openings to be paid for will be determined from actual count of the completed units in place.

The contract unit price paid for access opening, soffit shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the soffit access opening, complete in place, including closing the soffit access opening and removing forms and miscellaneous concrete, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.27AA REMOVE CONCRETE

Concrete, where shown on the plans to be removed, shall be removed.

Removing concrete curb will be measured by the linear foot, measured along the curb before removal operations.

Removing concrete sidewalk will be measured by the square yard, measured before removal operations.

Removing concrete barrier will be measured by the linear foot, measured along the barrier before removal operations.

Removing concrete drainage structures will be measured by the cubic yard, measured before and during removal operations.

Concrete removed shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

10-1.27BB REMOVE AND REPLACE CONCRETE (CHANNEL)

Remove and replace concrete (channel), shall consist of saw cutting and removing portions of concrete channel at Rio Hondo Bridge, Bridge No. 53-0657, and replacing removed concrete at the locations and dimensions designated on the plans.

The Contractor shall notify the Engineer at least 2 working days before beginning this item of work.

A 3/4-inch deep saw cut shall be made along the perimeter of areas to be removed prior to removing concrete.

Existing channel reinforcement may be field bent to accommodate construction operations.

Remove and replace concrete (channel) will be paid for on a lump sum basis.

Concrete removed shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

Concrete shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Full compensation for saw cutting the channel and replacing concrete shall be included in the contract price paid for remove and replace concrete (channel) and no additional compensation will be allowed therefor.

Full compensation for protecting existing reinforcing in place shall be included in the contract price paid for remove and replace concrete (channel) and no additional compensation will be allowed therefor.

Where no joint exists between concrete to be removed and concrete to remain in place, the concrete shall be cut in a neat line to a minimum depth of 0.17-foot with a power driven saw before concrete is removed.

Where concrete has been removed outside the roadway prism, the backfilled areas shall be graded to drain and blend in with the surrounding terrain.

Concrete to be removed which has portions of the same structure both above and below ground will be considered as concrete above ground for compensation.

10-1.27CC JACKING SUPERSTRUCTURE

Jacking superstructure shall consist of lowering the superstructure of Garvey Avenue Off-Ramp Undercrossing (Bridge No. 53-1032) as shown on the plans and in accordance with the requirements in these special provisions.

GENERAL.—Attention is directed to "Order of Work" and "Maintaining Traffic," elsewhere in these special provisions.

The Contractor shall design the temporary supports for the superstructure and determine the methods and equipment for lowering the superstructure.

At least 5 weeks before starting the work the Contractor shall submit to the Engineer complete calculations, details and working drawings of the temporary supports, methods and equipment he proposes to use in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. Working drawings and calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California.

LOWERING OPERATIONS.—The supports and jacking equipment shall accommodate the structure dead load shown on the plans and any additional loads due to the Contractor's operations. The lowering system shall provide total stability of the structure throughout the lowering operations.

Systems involving modifications to the bridge that impair the structural integrity, intended serviceability or design capacity of the bridge shall not be used.

A redundant system of supports for back-up should the primary lowering system fail shall be provided. Such redundant system shall include stacks of steel plates that will be removed one by one as the superstructure is lowered. Steel plates shall be maintained to within 3/4 inch of the superstructure soffit during the entire lowering process.

Monitoring and control devices to assure proper load distribution and lowering shall be provided. The superstructure shall be lowered uniformly without distortion that would cause damage to the structure.

The superstructure shall be lowered to the position shown on the plans so that the load is distributed uniformly across each abutment. Galvanized shims shall be placed, as approved by the Engineer, when they are required to provide uniform loading at bearing pads.

Damage to the structure as a result of the Contractor's operations shall be repaired or replaced by the Contractor at his expense in accordance with the requirements for new work of similar character.

After lowering the superstructure, all members installed on the bridge for jacking the superstructure shall be removed and the bridge surfaces shall be finished.

PAYMENT.—Jacking superstructure will be paid for on the basis of a lump sum price. The contract lump sum price paid for jacking superstructure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in jacking the superstructure (including shimming at bearing pads), complete in place as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.27DD TEMPORARY SUPPORTS

Temporary supports for existing structures during bridge removal, reconstruction and retrofit work shall be designed, furnished, constructed, monitored, maintained and removed in accordance with the requirements of these special provisions.

Construction sequence and application of temporary support jacking loads shall be as shown on the plans. Proposed changes to the construction sequence and application of temporary support jacking loads shall be subject to the Engineer's approval.

Temporary supports shall include jacking assemblies and appurtenant items necessary to jack and support the structures.

Approval by the Engineer of the temporary support working drawings or temporary support inspection performed by the Engineer will in no way relieve the Contractor of full responsibility for the temporary supports.

TEMPORARY SUPPORT DESIGN AND DRAWINGS

The Contractor shall submit to the Engineer working drawings and design calculations for the temporary supports. Such drawings and design calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California. The temporary support working drawings and design calculations shall conform to the requirements in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The number of sets of drawings and design calculations and times for review for temporary supports shall be the same as specified for falsework working drawings in Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications.

In addition to the requirements in Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications, the following requirements shall apply:

The time to be provided for the Engineer's review of the working drawings for specific structures, or portions thereof, shall be as follows:

Structure or Portion of Structure	Review Time - Weeks
San Gabriel River Bridge Widen (53-0109)	4

Working drawings for any part of the temporary supports shall include stress sheets, anchor bolt layouts, shop details, erection and removal plans.

The temporary support working drawings shall include descriptions and values of all loads, including construction equipment loads, descriptions of equipment to be used, complete details and calculations for jacking and supporting the existing structure, and descriptions of the displacement monitoring system. The displacement monitoring system shall include equipment to be used, location of control points, method and schedule of taking measurements, and shall also include provisions to jack the structure should settlement occur in the temporary supports.

A redundant system of supports shall be provided during the entire jacking operation for backup should any of the jacks fail. The redundant system shall include stacks of steel plates added as necessary to maintain the redundant supports at each jack location within 1/4 inch of the jacking sill or corbels.

When footing type foundations are to be used, the Contractor shall determine the bearing value of the soil and shall show the values assumed in the design of the temporary supports on the temporary support drawings. Anticipated temporary support foundation settlement shall be shown on the temporary support drawings.

When pile type foundations are to be used, the temporary support drawings shall show the maximum horizontal distance that the top of a temporary support pile may be pulled in order to position it under its cap. The temporary support plans shall also show the maximum allowed deviation of the top of the pile, in its final position, from a vertical line through the point of fixity of the pile.

The Contractor may use the permanent piles as part of the temporary support foundation. Permanent piles shall not be moved or adjusted from the locations shown on the plans. Any use of the permanent piles and the loads imposed on them shall be shown on the temporary support drawings. Should the Contractor propose to provide piles longer than required for the work in order to support the temporary supports above the elevation of the top of the footing and later cut off the piles at their final elevation, shear devices adequate to transfer all pile reactions into the footing will be required.

Temporary support footings shall be designed to carry the load imposed upon them without exceeding the estimated soil bearing values and anticipated settlements.

Bracing shall be provided, as necessary, to withstand all imposed loads during erection and removal of any temporary supports. The temporary support drawings shall show provisions for such temporary bracing or methods to be used to conform to these requirements during each phase of erection and removal. Wind loads shall be included in the design of such bracing or methods. Wind loads shall conform to the applicable paragraphs in Section 51-1.06A(1), "Design Loads," of the Standard Specifications.

The temporary support design calculations shall show a summary of computed stresses in the (1) temporary supports, (2) connections between temporary supports and the existing structure and (3) existing load supporting members. The computed stresses shall include the effect of the jacking sequence. The temporary support design calculations shall also include a lateral stiffness assessment of the temporary support system and conform to the design values shown on the plans.

The design of temporary supports will not be approved unless it is based on the use of loads and conditions which are no less severe than those described in the Section, "Temporary Support Design Criteria," of these special provisions and on the use of allowable stresses which are no greater than those described in Section 51-1.06A(2), "Design Stresses, Loadings, and Deflections," of the Standard Specifications.

If falsework loads are imposed on temporary supports, the temporary supports shall also satisfy the deflection criteria described in Section 51-1.06A(2), "Design Stresses, Loadings, and Deflections," of the Standard Specifications.

TEMPORARY SUPPORT DESIGN CRITERIA

The temporary supports shall support the initial jacking loads and the minimum temporary support design loads and the minimum lateral design forces shown on the plans. The vertical design loads shall be adjusted for the weight of temporary supports and jacks, construction equipment loads and additional loads imposed by the Contractor's operations. The construction equipment loads shall be the actual weight of the construction equipment but in no case shall be less than 20 pounds per square foot of deck surface area of the frame involved. A frame is defined as the portion of the bridge between expansion joints.

The temporary supports shall resist the specified lateral design forces. The lateral design forces to be resisted shall be increased to be compatible with the temporary support lateral stiffness if the stiffness exceeds the specified minimum.

The existing structure shall be mechanically connected to the temporary supports. The temporary supports shall be mechanically connected to their foundations. The mechanical connections shall be capable of resisting the lateral temporary support design forces. Friction forces developed between the existing structure and temporary supports shall not be used to reduce the lateral forces and shall not be considered as an effective mechanical connection. The mechanical connections shall be designed to tolerate adjustments to the temporary support frame throughout the use of the temporary supports.

If the concrete is to be prestressed, the temporary supports shall be designed to support any increased or readjusted loads caused by the prestressing forces.

MANUFACTURED ASSEMBLIES:

Manufactured assemblies shall conform to the provisions in Section 51-1.06A(2), of the Standard Specifications and these special provisions.

Each jack shall be equipped with either a pressure gage or a load cell for determining the jacking force. Pressure gages shall have an accurately reading dial at least 6 inches in diameter. Each jack shall be calibrated by a private laboratory approved by the Transportation Laboratory within 6 months prior to use and after each repair, unless otherwise directed. Each jack and its gage shall be calibrated as a unit with the cylinder extension in the approximate position that it will be at final jacking force and shall be accompanied by a certified calibration chart. Load cells shall be calibrated and provided with an indicator by which the jacking force is determined.

SPECIAL LOCATIONS

Attention is directed to Section 51-1.06A(3), "Special Locations," of the Standard Specifications. All reference to falsework in this Section shall also apply to temporary supports.

TEMPORARY SUPPORT CONSTRUCTION

Attention is directed to Paragraphs 1 through 7 of Section 51-1.06B, "Falsework Construction," of the Standard Specifications and to the loads shown on the plans. All reference to falsework in these paragraphs shall also apply to temporary supports.

Welding, welder qualification, and inspection of welding for all steel members shall conform to the requirements of ANSI/AASHTO/AWS D1.5.

Prior to proceeding with bridge removal, an engineer for the Contractor who is registered as a Civil Engineer in the State of California shall inspect the temporary supports, including jacking and displacement monitoring systems, for conformity with the working drawings. The Contractor's registered engineer shall certify in writing that the temporary supports, including jacking and displacement monitoring systems, substantially conform to the working drawings, and that the material and workmanship are satisfactory for the purpose intended. A copy of this certification shall be available at the site of the work at all times.

The Contractor's registered engineer shall be present at the bridge site at all times when jacking operations or adjustments are in progress and when bridge removal operations are in progress. The Contractor's registered engineer shall inspect the jacking and removal operation and report in writing on a daily basis the progress of the operation and the status of the remaining structure. A copy of the daily report shall be available at the site of the work at all times. Should an unplanned event occur, the Contractor's registered engineer shall submit immediately to the Engineer for approval, the procedure or proposed operation to correct or remedy the occurrence.

The Contractor shall perform an initial survey as part of the displacement monitoring system to record the location of the existing structure prior to the commencement of any work. Two copies of the survey shall be signed by an engineer, who is registered as a Civil Engineer in the State of California, and submitted to the Engineer.

Vandal-resistant displacement monitoring equipment shall be provided and maintained. Vertical and horizontal displacements of the temporary supports and the existing structure shall be monitored continuously during jacking operations and shall be accurately measured and recorded at least weekly during removal and reconstruction work. As a minimum, elevations shall be taken prior to the start of jacking operations, immediately after jacking is complete, after bridge removal is complete, before connecting the retrofitted superstructure to the substructure, and after the temporary supports have been removed. As a minimum, the existing structure shall be monitored at the bent and at mid span of both adjoining spans. Control points at each location shall be located near the center and at both edges of the superstructure. The records of vertical and horizontal displacement shall be signed by an engineer who is registered as a Civil Engineer in the State of California and available to the Engineer at the jobsite during normal working hours, and a copy of the record shall be delivered to the Engineer at the completion of reconstructing each bent.

A force equal to the initial jacking load or the dead load shown on the plans shall be applied to the structure by the temporary support system and held until all initial compression and settlement of the system is completed before bridge removal work at the location being supported is begun.

Jacking operations shall be carefully controlled and monitored to ensure that the jacking loads are applied simultaneously to prevent distortion and excessive stresses that would damage the structure. The superstructure shall be jacked as necessary to maintain the total vertical displacements at control points to less than 1/4 inch from the elevations recorded prior to jacking or as modified by the Engineer.

Should unanticipated displacements, cracking or other damage occur, the construction shall be discontinued until corrective measures satisfactory to the Engineer are performed. Damage to the structure as a result of the Contractor's operations shall be repaired by the Contractor according to the requirements in Section 7-1.11, "Preservation of Property," of the Standard Specifications.

Following completion of the reconstruction, the monitored control points shall not deviate from the vertical position by more than 1/4 inch from the initial survey elevations or the elevations as modified by the Engineer.

REMOVING TEMPORARY SUPPORTS

Attention is directed to Section 51-1.06C, "Removing Falsework," of the Standard Specifications. All references to falsework in this section shall also apply to temporary supports, except that when public traffic is carried on the structure on temporary supports, paragraph 8 is amended to read:

No temporary supports shall be released until the supported concrete has attained 100 percent of the specified strength.

Attachments shall be removed from the existing structure and concrete surfaces restored to original conditions, except where permanent alterations are shown on the plans.

PAYMENT.--The contract lump sum price paid for temporary supports shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in designing, constructing, maintaining, and removing the temporary supports, including jacking the existing structure and monitoring displacements, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.27EE REMOVE ASPHALT CONCRETE SURFACING

The existing asphalt concrete surfacing, membrane seal and reinforced concrete expansion dams shall be removed to the top of existing portland cement concrete slab at the San Gabriel River Bridge deck and bridge approach as shown on the plans and as described in these special provisions.

The method of removal shall be selected by the Contractor. Equipment or procedures that damage the remaining concrete surface, as determined by the Engineer, shall not be used.

The outline of the asphalt concrete to be removed shall be cut with a power-driven saw to a depth of not less than 0.15-foot before removing the surfacing. Surfacing shall be removed without damage to surfacing that is to remain in place. Damage to pavement which is to remain in place shall be repaired to a condition satisfactory to the Engineer, or the damaged pavement shall be removed and replaced with new asphalt concrete when ordered by the Engineer. Repairing or removing and replacing pavement damaged outside the limits of surfacing to be removed shall be at the Contractor's expense and will not be measured or paid for.

All removed materials shall become the property of the Contractor and shall be disposed of in accordance with Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Remove asphalt concrete surfacing will be measured by the square yard.

The contract price paid per square yard for remove asphalt concrete surfacing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing asphalt concrete surfacing, membrane seal, and reinforced concrete expansion dams, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.28 CLEARING AND GRUBBING

Clearing and grubbing shall conform to the provisions in Section 16, "Clearing and Grubbing," of the Standard Specifications and these special provisions.

Attention is directed to "Indemnification and Insurance" and "Aerially Deposited Lead, General" of these special provisions.

Vegetation shall be cleared and grubbed only within the excavation and embankment slope lines.

Vegetation shall be separated from soil and soil shall remain on site.

At locations where there is no grading adjacent to a bridge or other structure, clearing and grubbing of vegetation shall be limited to 5 feet outside the physical limits of the bridge or structure.

Activities controlled by the Contractor, except cleanup or other required work, shall be confined within the graded areas of the roadway.

Nothing herein shall be construed as relieving the Contractor of the Contractor's responsibility for final cleanup of the highway as provided in Section 4-1.02, "Final Cleaning Up," of the Standard Specifications.

10-1.29 EARTHWORK

Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these special provisions.

Attention is directed to "Indemnification and Insurance," elsewhere in these special provisions.

Delete the first paragraph of Section 19-1.02, "Preservation of Property," of the Standard Specifications.

Attention is directed to Sections 7-1.11, "Preservation of Property," 7-1.16, "Contractor's Responsibility for the Work and Materials," and 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications.

Delete the fourth paragraph of Section 19-1.02, "Preservation of Property," of the Standard Specifications.

In addition to the requirements in Sections 5-1.02, "Plans and Working Drawings," and 5-1.02A, "Trench Excavation Safety Plans," plans of the shoring details for excavations on or affecting railroad property will be reviewed for adequacy of protection provided for railroad facilities, property, and traffic. Those plans shall be submitted at least 12 weeks before the Contractor intends to begin excavation requiring the shoring. Approval by the Engineer of the plans for the shoring details will be contingent upon the plans being satisfactory to the railroad company involved.

Delete the seventh paragraph of Section 19-3.03, "Cofferdams," of the Standard Specifications.

In accordance with the provisions in Section 5-1.02, "Plans and Working Drawings," the Contractor shall submit to the Engineer, for approval, drawings showing the Contractor's proposed method of cofferdam construction and other details left open to the Contractor's choice or not fully shown on the plans. Except for drawings of cofferdams on or affecting railroad property, the drawings shall be submitted at least 3 weeks in advance of the time the Contractor begins construction of the cofferdams. Drawings of cofferdams on or affecting railroad property shall be submitted at least 12 weeks in advance of the time the Contractor begins construction of cofferdams. Approval by the Engineer of the drawings for the cofferdams will be contingent upon the plans being satisfactory to the railroad company involved.

Delete the twelfth paragraph of Section 19-3.06, "Structure Backfill," of the Standard Specifications.

Structure backfill placed at bridge supports in waterways and water channels, and not beneath any embankment, pavement or slope protection, need not be compacted, shall consist of soil which is free of organic matter, trash or other unsatisfactory material, and shall be placed to the level of the original ground or finished grade.

Attention is directed to "Material Containing Aerially Deposited Lead" of these special provisions.

The grading plane of embankments beneath structure approach slabs and beneath the thickened portion of sleeper slabs shall not project above the grade established by the Engineer.

Sand backfill shall conform to the provisions in Section 19-3.025B, "Sand Bedding," of the Standard Specifications.

Concrete shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Surplus excavated material not designated or determined to contain aerially deposited lead shall become the property of the Contractor and shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Where a portion of existing surfacing is to be removed, the outline of the area to be removed shall be cut on a neat line with a power-driven saw to a minimum depth of 0.17-foot before removing the surfacing. Full compensation for cutting existing surfacing shall be considered as included in the contract price paid per cubic yard for roadway excavation and no additional compensation will be allowed therefor.

Existing edge drains and treated permeable base encountered during excavation operations shall be removed and disposed of.

Full compensation for removing and disposing of edge drains, treated permeable base and removal of rock slope protection at drainage system 48g shall be considered as included in the contract unit price paid per cubic yard for excavation of the types involved and no separate payment will be made therefor.

10-1.30 MATERIAL CONTAINING AERIALLY DEPOSITED LEAD

Earthwork involving materials containing aerially deposited lead shall conform to the provisions in "Earthwork" and this section "Material Containing Aerially Deposited Lead" of these special provisions.

Attention is directed to "Aerially Deposited Lead" of these special provisions.

Type Y material contains aerially deposited lead in average concentrations greater than or equal to 0.000167 ounces/quart Soluble Lead and between 0 - 0.0056 ounces/pound (inclusive) Total Lead, as tested using the California Waste Extraction Test. Type Y material exists at various locations and depths shown on the plans. These materials shall be placed as shown on the plans, unless otherwise directed by the Engineer, and covered with a minimum one foot layer of non-hazardous soil or pavement. These materials are hazardous waste regulated by the State of California that may be reused as permitted under the Variance of the Department of Toxic Substances Control. Temporary surplus material may be generated on this project due to the requirements of stage construction. Temporary Type Y surplus material shall not be transported outside the project limits. In order to conform to the requirements of these provisions, it may be necessary to stockpile Type Y materials for subsequent stages or construct some embankments out of stage or handle temporary surplus material more than once.

Type Y materials used for structure backfill shall conform to the requirements in Section 19-3.06, "Structure Backfill," of the Standard Specifications and the expansion index requirements shown on the plans. Type Y materials not meeting these requirements shall be buried in other areas within the right of way designated by the Engineer. Full compensation for burying unsuitable Type Y materials in other areas designated by the Engineer shall be considered as included in the contract prices paid per cubic yard for roadway excavation (Type Y) or structure excavation (Type Y) and no additional compensation will be allowed therefor.

Type Z-2 material contains aurally deposited lead in average concentrations (1) greater than or equal to 0.016 ounces/pound Total Lead, or (2) greater than or equal to 0.000167 ounces/quart Soluble Lead, as tested using the California Waste Extraction Test, and the material is surplus, or (3) greater than or equal to 0.000167 ounces/quart Soluble Lead and greater than 0.0056 ounces/pound Total Lead, as tested using the California Waste Extraction Test. Type Z-2 material exists at various locations and depths shown on the plans. These materials are hazardous waste regulated by the State of California and shall be transported to and disposed of at a Class 1 Disposal Site. Materials excavated from these areas shall be transported by a hazardous waste transporter registered with the Department of Toxic Substances Control using the required procedures for creating a manifest of materials. The vehicles used to transport the hazardous materials shall conform to the current certifications of compliance of the Department of Toxic Substances Control.

LEAD COMPLIANCE PLAN

The Contractor shall prepare a project specific Lead Compliance Plan to prevent or minimize worker exposure to lead while handling material containing aurally deposited lead. Attention is directed to Title 8, California Code of Regulations, Section 1532.1, "Lead," for specific Cal-OSHA requirements when working with lead.

The Lead Compliance Plan shall contain the elements listed in Title 8, California Code of Regulations, Section 1532.1(e)(2)(B). Before submission to the Engineer, the Lead Compliance Plan shall be approved by an Industrial Hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene. The Plan shall be submitted to the Engineer for review and acceptance at least 15 days prior to beginning work in areas containing aurally deposited lead.

The Contractor shall not work in areas containing aurally deposited lead within the project limits, unless authorized in writing by the Engineer, until the Engineer has accepted the Lead Compliance Plan.

Prior to performing work in areas containing aurally deposited lead, personnel who have no prior training or are not current in their training status, including State personnel, shall complete a safety training program provided by the Contractor. The safety training program shall meet the requirements of Title 8, California Code of Regulations, Section 1532.1, "Lead."

Personal protective equipment, training, and washing facilities required by the Contractor's Lead Compliance Plan shall be supplied to State personnel by the Contractor. The number of State personnel will be 4.

The Engineer will notify the Contractor of acceptance or rejection of any submitted or revised Lead Compliance Plan not more than 10 days after submittal of the plan.

The contract lump sum price paid for Lead Compliance Plan shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparing the Lead Compliance Plan, including paying the Certified Industrial Hygienist, and for providing personal protective equipment, training and medical surveillance, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

EXCAVATION AND TRANSPORTATION PLAN

Within 15 days after approval of the contract, the Contractor shall submit 3 copies of the Excavation and Transportation Plan to the Engineer. The Engineer will have 7 days to review the Excavation and Transportation Plan. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the Excavation and Transportation Plan within 7 days of receipt of the Engineer's comments. The Engineer will have 7 days to review the revisions. Upon the Engineer's approval of the Excavation and Transportation Plan, 3 additional copies of the Excavation and Transportation Plan incorporating the required changes shall be submitted to the Engineer. Minor changes or clarifications to the initial submittal may be made and attached as amendments to the Excavation and Transportation Plan. In order to allow construction to proceed, the Engineer may conditionally approve the Excavation and Transportation Plan while minor revisions or amendments to the Plan are being completed.

The Contractor shall prepare a written, project specific Excavation and Transportation Plan establishing the procedures the Contractor will use to comply with requirements for excavating, transporting, and placing (or disposing) of material containing aurally deposited lead. The Excavation and Transportation Plan shall conform to the regulations of the Department of Toxic Substance Control and the California Division of Occupational Safety and Health Administration (Cal-OSHA). The sampling and analysis plans shall meet the requirements for the design and development of the sampling plan, statistical analysis, and reporting of test results contained in USEPA, SW 846, "Test Methods for Evaluating Solid Waste," Volume II: Field Manual Physical/Chemical, Chapter Nine, Section 9.1. The plan shall contain, but not be limited to the following elements:

- A. Excavation schedule (by location and date)
- B. Temporary locations of stockpiled material
- C. Sampling and analysis plans for areas after removal of a stockpile
 - 1. Location and number of samples
 - 2. Analytical laboratory

- D. Sampling and analysis plan for soil cover
- E. Dust control measures
- F. Air monitoring
 - 1. Location and type of equipment
 - 2. Sampling frequency
 - 3. Analytical laboratory
- G. Transportation equipment and routes
- H. Method for preventing spills and tracking material onto public roads
- I. Truck waiting and staging areas
- J. Site for disposal of hazardous waste
- K. Spill Contingency Plan for material containing aurally deposited lead

DUST CONTROL

Excavation, transportation, placement, and handling of materials containing aurally deposited lead shall result in no visible dust migration. The Contractor shall have a water truck or tank on the job site at all times while clearing and grubbing and performing earthwork operations in work areas containing aurally deposited lead.

Stockpiles of material containing aurally deposited lead shall not be placed where affected by surface run-on or run-off. Stockpiles shall be covered with plastic sheeting 0.33 mm minimum thickness or 0.3 m of non-hazardous material. Stockpiles shall not be placed in environmentally sensitive areas. Stockpiled material shall not enter storm drains, inlets, or waters of the State.

MATERIAL TRANSPORTATION

Prior to traveling on public roads, loose and extraneous material shall be removed from surfaces outside the cargo areas of the transporting vehicles and the cargo shall be covered with tarpaulins, or other cover, as outlined in the approved Excavation and Transportation Plan. The Contractor shall be responsible for costs due to spillage of material containing lead during transport. The Department will not consider the Contractor a generator of these hazardous materials, and the Contractor will not be obligated for further cleanup, removal, or remedial action for such materials handled or disposed of in conformance with the requirements specified in these special provisions and the appropriate State and Federal laws and regulations and county and municipal ordinances and regulations regarding hazardous waste.

DISPOSAL

Surplus materials whose lead content is not known shall be analyzed for aurally deposited lead by the Contractor prior to removing the materials from within the project limits. The Contractor shall submit a sampling and analysis plan and the name of the analytical laboratory to the Engineer at least 15 days prior to beginning sampling or analysis. The Contractor shall use a laboratory certified by the California Department of Health Services. Sampling shall be at a minimum rate of one sample for each 200 cubic yards of surplus material and tested for lead using EPA Method 6010 or 7000 series.

Sampling, analyses, and reporting of results for surplus materials not previously sampled will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Materials containing aurally deposited lead shall be disposed of within California. The disposal site shall be operating under a permit issued by the California Environmental Protection Agency (Cal-EPA) Boards.

The Engineer will obtain the Environmental Protection Agency (EPA) Generator Identification Number for hazardous material disposal. The Engineer will sign all hazardous waste manifests. The Contractor shall notify the Engineer five days before the manifests are to be signed.

Sampling, analyzing, transporting, and disposing of materials containing aurally deposited lead excavated outside the pay limits of excavation as shown on the plans and in the Engineer's Estimate, will be at the Contractor's expense.

MEASUREMENT AND PAYMENT

Quantities of roadway excavation (aurally deposited lead) and structure excavation (aurally deposited lead), of the types shown in the Engineer's Estimate, will be measured and paid for in the same manner specified for roadway excavation and structure excavation, respectively, in Section 19, "Earthwork," of the Standard Specifications.

Full compensation for preparing an approved Excavation and Transportation Plan, transporting material containing aurally deposited lead reused in the work from location to location, and transporting and disposing of material containing aurally deposited lead shall be considered as included in the contract prices paid per cubic meter for the items of roadway excavation (aurally deposited lead) and structure excavation (aurally deposited lead) involved, and no additional compensation will be allowed therefor.

No payment for stockpiling of material containing aurally deposited lead will be made, unless the stockpiling is ordered by the Engineer.

At the locations and to the limits shown on the plans, structure backfill (bridge) material shall also meet expansion index requirements as shown on the plans.

At locations where roadway embankment will be constructed adjacent to the limits of structure backfill (bridge) and structure backfill (retaining wall), the material used to construct such embankment shall be a low expansion material with an Expansion Index (EI) less than 51 as determined in accordance with ASTM Designation: D 4829.

Full compensation for conforming to the above expansion index requirements shall be considered as included in the contract prices paid for the various contract items of work and no additional compensation will be allowed therefor.

At the locations and to the limits shown on the plans, material below the bottom of bridge and earth retaining structure footings shall be removed and replaced with structural backfill (bridge) material in conformance with the placing and compacting requirements for structure backfill. The relative compaction shall be not less than 95 percent. Removal of the material will be measured and paid for as structure excavation (bridge) and furnishing, placing and compacting the replacement material will be measured and paid for as structure backfill (bridge).

At the locations and to the limits shown on the plans, material below the bottom of retaining wall footings shall be removed and replaced with material obtained from various on site excavation meeting the grading and quality requirements for structure backfill specified in Section 19-3.06 and in conformance with the placing and compacting requirements for structure backfill. The relative compaction shall be not less than 95 percent. Removal of the material will be measured and paid for as structure excavation (retaining wall) and furnishing, placing and compacting the replacement material will be measured and paid for as structure backfill (retaining wall).

At the footings where material is removed and replaced, as described herein, a relative compaction of not less than 95 percent shall be obtained for a minimum depth of 0.5-foot below the bottom of excavation.

The second sentence in the third paragraph of Section 19-1.02, "Preservation of Property," of the Standard Specifications is amended to read:

Such plans shall be submitted at least 12 weeks before the Contractor intends to begin excavation requiring said shoring.

If the Contractor elects to use the "Weep Hole and Geocomposite Drain" alternative where permitted on the plans, the geocomposite drain shall conform to the details shown on the plans and the following:

Attention is directed to "Engineering Fabrics" under "Materials" elsewhere in these special provisions.

At bridge locations excluding East El Monte Overhead (Br. No. 53-0867), geocomposite drain shall conform to the following:

Geocomposite drain shall consist of a manufactured core not less than 0.25-inch thick nor more than 2 inches thick with one or both sides covered with a layer of filter fabric that will provide a drainage void. The drain shall produce a flow rate, through the drainage void, of at least 2.0 gallons per minute per foot width at a hydraulic gradient of 1.0 and a minimum externally applied pressure of 3,500 pounds per square foot.

At the East El Monte Overhead (Br. No. 53-0867), geocomposite drain shall conform to the following:

Geocomposite drain shall consist of a manufactured core not less than 0.25-inch thick nor more than 2 inches thick with one or both sides covered with a layer of filter fabric that will provide a drainage void. The drain shall produce a flow rate, through the drainage void, of at least 2.0 gallons per minute per foot width at a hydraulic gradient of 1.0 and a minimum externally applied pressure of 5,000 pounds per square foot.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished for the geocomposite drain certifying that the drain produces the required flow rate and complies with these special provisions. The Certificate of Compliance shall be accompanied by a flow capability graph for the geocomposite drain showing flow rates for externally applied pressures and hydraulic gradients. The flow capability graph shall be stamped with the verification of an independent testing laboratory.

Filter fabric for the geocomposite drain shall conform to the provisions for fabric for underdrains in Section 88, "Engineering Fabrics," of the Standard Specifications.

The manufactured core shall be either a preformed grid of embossed plastic, a mat of random shapes of plastic fibers, a drainage net consisting of a uniform pattern of polymeric strands forming 2 sets of continuous flow channels, or a system of plastic pillars and interconnections forming a semirigid mat.

The core material and filter fabric shall be capable of maintaining the drainage void for the entire height of geocomposite drain. Filter fabric shall be integrally bonded to the side of the core material with the drainage void. Core material manufactured from impermeable plastic sheeting having nonconnecting corrugations shall be placed with the corrugations approximately perpendicular to the drainage collection system.

The geocomposite drain shall be installed with the drainage void and the filter fabric facing the embankment. The fabric facing the embankment side shall overlap a minimum of 3 inches at all joints and wrap around the exterior edges a minimum of 3 inches beyond the exterior edge. If additional fabric is needed to provide overlap at joints and wrap-around at edges, the added fabric shall overlap the fabric on the geocomposite drain at least 6 inches and be attached thereto.

Should the fabric on the geocomposite drain be torn or punctured, the damaged section shall be replaced completely or repaired by placing a piece of fabric that is large enough to cover the damaged area and provide a 6-inch overlap.

Plastic pipe shall conform to the provisions for pipe for edge drains and edge drain outlets in Section 68-3, "Edge Drains," of the Standard Specifications.

Treated permeable base to be placed around slotted plastic pipe at the bottom of the geocomposite drain shall be cement treated permeable base conforming to the provisions for cement treated permeable base in Section 29, "Treated Permeable Bases," of the Standard Specifications and these special provisions.

The treated permeable base shall be enclosed with a high density polyethylene sheet or PVC geomembrane, not less than 10 mils thick, which is bonded with a suitable adhesive to the concrete and geocomposite drain. Surfaces to receive the polyethylene sheet shall be cleaned before applying the adhesive. The treated permeable base shall be compacted with a vibrating shoe type compactor.

MEASUREMENT AND PAYMENT (EARTHWORK)

Measurement and payment for earthwork shall conform to all provisions for "Measurement" and "Payment" in Section 19, "Earthwork," of the Standard Specifications and these special provisions.

Pervious backfill material in connection with the bridge work will be measured and paid for by the cubic yard as structure backfill (bridge).

Pervious backfill material within the limits of payment for retaining walls will be measured and paid for by the cubic yard as structure backfill (retaining wall).

If structure excavation or structure backfill involved in bridges is not otherwise designated by type, and payment for the structure excavation or structure backfill has not otherwise been provided for in the Standard Specifications or these special provisions, the structure excavation or structure backfill will be paid for at the contract price per cubic yard for structure excavation (bridge) or structure backfill (bridge).

Full compensation for furnishing and installing 8" PSP drain at the Stewart Street OR Undercrossing (Widen) shall be considered as included in the contract price paid per cubic yard for structure backfill (bridge) and no additional compensation will be allowed therefor.

Full compensation for geocomposite drain system used in lieu of pervious backfill material shall be considered as included in the contract price paid per cubic yard for structure backfill (bridge) or structure backfill (retaining wall) and no additional compensation will be allowed therefor.

Structure excavation designated as (Type D), for footings at the locations shown on the plans, will be measured and paid for by the cubic yard as structure excavation (Type D). Ground water or surface water is expected to be encountered at these locations, but seal course concrete is not shown or specified. Structure excavation for footings at locations not designated on the plans as structure excavation (Type D) and where ground or surface water is encountered, will be measured and paid for by the cubic yard as structure excavation (bridge).

10-1.31 CONTROLLED LOW STRENGTH MATERIAL

Controlled low strength material shall consist of a workable mixture of aggregate, cementitious materials, and water and shall conform to the provisions for slurry cement backfill in Section 19-3.062, "Slurry Cement Backfill," of the Standard Specifications and these special provisions.

At the option of the Contractor, controlled low strength material may be used as structure backfill for pipe culverts, except that controlled low strength material shall not be used as structure backfill for aluminum and aluminum-coated culverts nor for culverts having a diameter or span greater than 20 feet.

When controlled low strength material is used for structure backfill, the width of the excavation shown on the plans may be reduced so that the clear distance between the outside of the pipe and the side of the excavation, on each side of the pipe, is a minimum of 12 inches. This minimum may be reduced to 6 inches when the height of cover is less than or equal to 20 feet or the pipe diameter or span is less than 42 inches.

Controlled low strength material in new construction shall not be permanently placed higher than the basement soil. For trenches in existing pavements, permanent placement shall be no higher than the bottom of the existing pavement permeable drainage layer. If a drainage layer does not exist, permanent placement in existing pavements shall be no higher than one

inch below the bottom of the existing asphalt concrete surfacing or no higher than the top of base below the existing portland cement concrete pavement. The minimum height that controlled low strength material shall be placed, relative to the culvert invert, is 0.5 diameter or 0.5 height for rigid culverts and 0.7 diameter or 0.7 height for flexible culverts.

When controlled low strength material is proposed for use, the Contractor shall submit a mix design and test data to the Engineer for approval prior to excavating the trench for which controlled low strength material is proposed for use. The test data and mix design shall provide for the following:

- A. A 28-day compressive strength between 50 psi and 100 psi for pipe culverts having a height of cover of 20 feet or less and a minimum 28-day compressive strength of 100 psi for pipe culverts having a height of cover greater than 20 feet. Compressive strength shall be determined in conformance with the requirements in ASTM Designation: D 4832.
- B. When controlled low strength material is used as structure backfill for pipe culverts, the sections of pipe culvert in contact with the controlled low strength material shall conform to the requirements of Chapter 850 of the Highway Design Manual using the minimum resistivity, pH, chloride content, and sulfate content of the hardened controlled low strength material. Minimum resistivity and pH shall be determined in conformance with the requirements of California Test 643. The chloride content shall be determined in conformance with the requirements of California Test 422 and the sulfate content shall be determined in conformance with the requirements of California Test 417.
- C. Cement shall be any type of portland cement conforming to the requirements in ASTM Designation: C 150; or any type of blended hydraulic cement conforming to the requirements in ASTM Designation: C 595M or the physical requirements in ASTM Designation: C 1157M. Testing of cement will not be required.
- D. Admixtures may be used in conformance with the provisions in Section 90-4, "Admixtures," of the Standard Specifications. Chemical admixtures containing chlorides as Cl in excess of one percent by mass of admixture, as determined in conformance with the requirements of California Test 415, shall not be used. If an air-entraining admixture is used, the maximum air content shall be limited to 20 percent. Mineral admixtures shall be used at the Contractor's option.

Materials for controlled low strength material shall be thoroughly machine-mixed in a pugmill, rotary drum or other approved mixer. Mixing shall continue until the cementitious material and water are thoroughly dispersed throughout the material. Controlled low strength material shall be placed in the work within 3 hours after introduction of the cement to the aggregates.

When controlled low strength material is to be placed within the traveled way or otherwise to be covered by paving or embankment materials, the material shall achieve a maximum indentation diameter of 3 inches prior to covering and opening to public traffic. Penetration resistance shall be measured in conformance with the requirements in ASTM Designation: D 6024.

Controlled low strength material used as structure backfill for pipe culverts will be considered structure backfill for compensation purposes.

10-1.32 PREPARE SUBGRADE AND SUBBALLAST (RAILROAD SHOOFLY)

Prepare subgrade and subballast (railroad shoofly) shall consist of preparing the subgrade and subballast for the Union Pacific Railroad (UPRR) and the Southern California Region Rail Authority (Metro Link) shoofly tracks adjacent to the existing railroad tracks and at other locations within the existing railroad right of way in conformance with the details shown on the plans and these special provisions.

Attention is directed to "Aerially Deposited Lead," "Material Containing Aerially Deposited Lead," and "Relations with the Railroad" of these special provisions.

Construction of ties, rails and ballast will be done by others.

Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these special provisions. Where shown on the plans, the existing ground shall be scarified, watered, graded and compacted to not less than 95 percent relative compaction for a minimum depth of 10 inches below original ground. Where shown on the plans, existing ground adjacent to the subgrade preparation areas shall be graded, including construction of drainage swales to provide positive drainage flow.

Subballast material used for shoofly tracks shall be Class 2 aggregate bases, 3/4-inch grading conforming to the provisions in Section 26, "Aggregate Base," of the Standard Specifications, except for payment.

The area where railroad shoofly subgrade shall be prepared and subballast placed shall be cleared of weeds, grass and debris. Removed weeds and grass shall be disposed of outside the railroad and highway rights of way in conformance with the provisions in Section 7-1.13 of the Standard Specifications.

In areas where existing ballast material is present within the limits of subgrade to be prepared and subballast to be placed, the ballast material shall be stockpiled within the railroad right of way at a location designated by the Engineer.

Failed or other unsatisfactory portions of the existing ground within the limits of prepare subgrade and ballast shall be removed and disposed of outside the railroad and highway rights of way. The areas and depths to be removed shall be as directed by the Engineer. The exposed areas shall be watered and compacted and the space shall be filled with Class 3 aggregate base. Class 3 aggregate base shall conform to the provisions in Section 26, "Aggregate Bases," of the Standard Specifications and "Aggregate Base," of these special provisions. Class 3 aggregate base used for this purpose will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

Where shown on the plans, the existing ground shall be scarified, watered, graded, and compacted to 95 percent relative compaction.

Soil contaminated by railroad activities may be encountered during excavation activities required to construct shooflys. Hazardous materials within the railroad right of way may include, but are not limited to lead contaminated soil and herbicides.

If additional material is required to level the ground, the additional material will be furnished and placed by Union Pacific Railroad Company.

Prepare subgrade and subballast (railroad shoofly) will be measured by the square yard. The quantity to be paid for will be limited to the areas shown on the plans.

The contract price paid per square yard for prepare subgrade and subballast (railroad shoofly) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in prepare subgrade and ballast (railroad shoofly), complete in place, including removal and stockpiling of existing ballast and removal, stockpiling, and replacement of excavated soil and Class 2 aggregate base, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for additional grading and construction of drainage swales shall be considered as included in the contract price paid per square yard for prepare subgrade and subballast (railroad shoofly) and no separate payment will be made therefor.

Full compensation for excavating, handling, stockpiling and replacement of contaminated materials shall be considered as included in the contract price paid per square yard for prepare subgrade and subballast (railroad shoofly) and no separate payment will be made therefor.

10-1.33 IRRIGATION CROSSOVERS

Irrigation crossovers shall conform to the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications and these special provisions.

Conduits shall be installed under existing paving by jacking or drilling methods in conformance with the provisions in Section 20-5.03B, "Conduit for Irrigation Crossovers and Sprinkler Control Crossovers," of the Standard Specifications.

Delete Section 20-5.02, "Materials," of the Standard Specifications.

Materials shall be commercial quality unless otherwise specified. Materials containing asbestos fibers shall not be used. Materials shall conform to the provisions in Section 20-2, "Materials," of the Standard Specifications and these special provisions.

Conduits shall be welded steel pipe.

Water line crossovers shall conform to the provisions in Section 20-5.03C, "Water Line Crossovers," of the Standard Specifications, and shall be polyvinyl chloride (PVC) plastic pipe, PVC plastic pipe water line crossovers shall have a minimum pressure rating (PR) shown on the plans.

Sprinkler control crossovers shall conform to the provisions in Section 20-5.027D, "Sprinkler Control Crossovers," of the Standard Specifications.

10-1.34 WATER SUPPLY LINE (BRIDGE)

Water supply lines identified on the plans as supply line (bridge) shall be of the size shown and shall conform to the details shown on the plans, the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications and these special provisions.

Unless otherwise shown on the project plans, casings shall be installed at each abutment, and casings shall be extended to the greater of: (1) 5 feet beyond the approach slab, (2) 5 feet beyond the end of the adjacent wingwall or (3) 20 feet beyond the abutment.

Working Drawings.--The Contractor shall submit complete working drawings for temporary support of the casing at the abutments to the Office of Structure Design, Documents Unit, Mail Station 9, 1801 30th Street, Sacramento, CA 95816, Telephone (916) 227-8252 in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications.

For initial review, 5 sets of drawings shall be submitted. After review, between 6 and 12 sets, as requested by the Engineer, shall be submitted to the Office of Structure Design for final approval and use during construction.

MATERIALS:--

Pipe and Fittings for Supply Lines Less Than 4-inch Diameter.--Pipe and fittings for supply lines less than 4-inch diameter shall conform to the provisions of Section 20-2.15A, "Steel Pipe," of the Standard Specifications.

Air Release Valve Assembly for Supply Lines Less Than 4-inch Diameter.--Air release valve assembly for supply lines less than 4-inch diameter shall consist of a line size threaded tee or pipe saddle, one-inch ball valve, automatic air release valve, and tank vent. Air release valve shall have cast iron body with stainless steel trim, stainless steel float, one-inch inlet pipe connection and 3/16 inch orifice. Tank vent shall be the size of air release valve outlet and have a double opening facing down with screen cover.

Casing Insulators for Supply Lines Less Than 4-inch Diameter.--Casing insulators for supply lines less than 4-inch diameter shall be designed for the size of casing and supply line shown on the plans. Casing insulators for supply line shall be high density, injection molded polyethylene, 2-piece construction with cadmium plated nuts and bolts and shall have a non-conductive inner liner. Casing insulators shall be factory constructed to ensure the supply line is centered in the casing to avoid any pipe to pipe contact and shall have at least two runners seated on the bottom of the casing.

Pipe End Seals for Supply Lines Less Than 4-inch Diameter.--Pipe end seals for supply lines less than 4-inch diameter shall cover the space between the supply line and the end of the casing. Pipe end seals shall be made with 2-inch thick construction grade redwood and cut to fit the supply line.

Expansion Assembly for Supply Lines Less Than 4-inch Diameter.--Expansion assembly for supply lines less than 4-inch diameter shall be hose type.

Hose shall be medium or heavy weight, oil resistant, flexible, rubber or synthetic rubber cover and tube, reinforced with not less than 2-ply of synthetic yarn or steel wire and shall be equipped with steel flanges. The hose and flange assembly shall be rated for a working pressure of not less than 200 psi.

All parts of the expansion assembly shall have the same nominal inside diameter as the supply line.

Casing.--Casing shall be welded steel pipe conforming to Section 70-1.02B, "Welded Steel Pipe," of the Standard Specifications, except that the pipe shall be treated in accordance with the following requirements, prior to shipping. Exterior surfaces of welded steel pipe shall be cleaned and coated in accordance with specifications of ANSI/AWWA C213 or at the option of the Contractor cleaned, primed and coated in accordance with specifications of ANSI/AWWA C214.

Pipe Wrapping Tape.--Wrapping tape for pipe in contact with the earth shall be a pressure sensitive polyvinyl chloride or polyethylene tape with a minimum thickness of 50 mils.

Pipe Hanger Assembly.--Pipe hanger assembly shall consist of concrete clevis plate or embedded steel welded linked eye rods, adjustable steel yoke, cast iron pipe roller, steel roller rod and hex nuts. Parts shall be galvanized. The pipe hanger assembly shall be suitable for the type and size of pipe installed and shall be as shown on the plans.

Steel hangers, anchor bolts, pipe clamps, nuts and bolts, and other fittings shall be suitable for the type and size of the supply lines or casing and shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

INSTALLATION:--

Water supply lines in bridge structures shall be supported as shown on the plans and in conformance with these special provisions.

If a blockout is provided in the bridge abutment wall for casing, the space between the casing and bridge abutment wall shall be filled with portland cement mortar conforming to the provisions in Section 51-1.135, "Mortar," of the Standard Specifications.

When the bridge superstructure is to be prestressed, the space around supply lines through abutments shall not be filled until the prestressing has been completed.

Openings for supply lines through bridge superstructure concrete shall either be formed or shall consist of pipe sleeves.

Cleaning and Closing of Pipe.--The interior of the pipe shall be cleaned before installation. Openings shall be capped or plugged as soon as the pipe is installed to prevent the entrance of any materials. The caps or plugs shall remain in place until their removal is necessary for completion of the installation.

Wrapping and Coating Pipe.--Damaged coating on supply line pipe in contact with the earth shall be wrapped with tape as follows:

1. Pipe to be wrapped shall be thoroughly cleaned and primed as recommended by the tape manufacturer.
2. Tapes shall be tightly applied with one-half uniform lap, free from wrinkles and voids to provide not less than 100 mils thickness.
3. Field joints and fittings for wrapped pipe shall be covered by double wrapping 50 mil thick tape. Wrapping at joints shall extend a minimum of 6 inches over adjacent pipe coverings. Width of tape for wrapping fittings shall not exceed 2 inches. Adequate tension shall be applied so tape will conform closely to contours of joint.

Where a casing passes through the abutment wall, the casing shall be wrapped with an additional 2 layers of asphalt-felt building paper conforming to the requirements of ASTM Designation: D 226, Type I, securely taped or wired in place.

TESTING.--

Water supply lines less than 4-inch diameter shall be tested in accordance with the provisions in Section 20-5.03H(1), "Method A," of the Standard Specifications, except that the testing period shall be 4 hours minimum with no leakage or pressure drop.

The Contractor shall furnish pipe anchorages to resist thrust forces occurring during testing. Leaks shall be repaired and defective materials shall be replaced by the Contractor at the Contractor's expense.

Pressure testing and necessary repairing of water lines shall be completed prior to backfilling, placing deck slabs over supply lines in box girder cells, or otherwise covering the supply lines.

Each end of water line shall be capped prior to and after the testing.

The supply line shall be tested as one unit. The limits of the unit shall be 5 feet beyond the casing at each end of the bridge.

MEASUREMENT AND PAYMENT.--

Measurement and payment for supply line (bridge) for each size listed in the Engineer's Estimate shall be made in the same manner as galvanized steel pipe and plastic pipe supply lines in Sections 20-5.04, "Measurement," and 20-5.05, "Payment," of the Standard Specifications.

Full compensation for furnishing and installing air release valves, steel hangers, steel brackets, and other fittings, casing and casing insulators, pipe end seals, testing and checking, and pipe wrapping tape, shall be considered as included in the contract prices paid per linear foot for the sizes of supply line (bridge) involved and no additional compensation will be allowed therefor.

10-1.35 AGGREGATE BASES

Aggregate bases shall be Class 2 and Class 3 and shall conform to the provisions in Section 26, "Aggregate Bases," of the Standard Specifications and these special provisions.

Delete the first paragraph of Section 26-1.02A, "Class 2 Aggregate Bases," of the Standard Specifications.

Aggregate for Class 2 aggregate base shall be clean and free from organic matter and other deleterious substances, and shall be of such nature that it can be compacted readily under watering and rolling to form a firm, stable base. Aggregate may include material processed from reclaimed asphalt concrete, portland cement concrete, lean concrete base, cement treated base or a combination of any of these materials.

Delete the third paragraph of Section 26-1.02A, "Class 2 Aggregate Bases," of the Standard Specifications.

Aggregate may include or consist of material processed from reclaimed asphalt concrete, portland cement concrete, lean concrete base, cement treated base, glass or a combination of any of these materials. Aggregate base incorporating reclaimed glass shall not be placed at locations where surfacing will not be placed over the aggregate base.

The fourth paragraph in said Section 26-1.02A, is amended by adding the following sentence:

Untreated reclaimed asphalt concrete and portland cement concrete will not be considered to be treated with lime, cement or other chemical material for purposes of performing the Durability Index test.

Section 26-1.02B, "Class 3 Aggregate Base," is amended by adding the following paragraph:

The grading of aggregate for Class 3 aggregate base shall, at the option of the Contractor, conform either to the grading specified in the special provisions or to either the 1 1/2-inch maximum or the 3/4 inch maximum grading for Class 2 aggregate base as provided in Section 26-1.02 A, "Class 2 Aggregate Base." Once a grading is selected, said grading shall not be changed without written approval of the Engineer.

Delete Section 26-1.02B, "Class 3 Aggregate Base," of the Standard Specifications.

Aggregate for Class 3 aggregate base shall and shall conform to the grading and quality requirements set forth in these special provisions. Aggregate for Class 3 aggregate base may include material processed from reclaimed asphalt concrete, portland cement concrete, lean concrete base, cement treated base or a combination of any of these materials.

The aggregate for Class 2 and Class 3 aggregate bases shall not be treated with lime, cement, or other chemical material before the Durability Index test is performed. Untreated reclaimed asphalt concrete and portland cement concrete will not be considered to be treated with lime, cement or other chemical material for purposes of performing the Durability Index test.

At the option of the Contractor, the aggregate for Class 3 aggregate base shall conform to either the 1 1/2 inch maximum or the 3/4 inch maximum grading.

Aggregate for Class 3 aggregate base shall be clean and free from organic matter and other deleterious substances and shall conform to the following requirements:

The percentage composition by weight shall conform to one of the following gradings:

Percentage Passing 1 1/2" Maximum		
Sieve Sizes	Operating Range	Contract Compliance
2"	100	100
1 1/2"	90 - 100	87 - 100
1"	-----	-----
3/4"	50 - 90	45 - 95
No. 4	25 - 60	20 - 65
No. 30	10 - 35	6 - 39
No. 200	3 - 15	0 - 19

Percentage Passing 3/4" Maximum		
Sieve Sizes	Operating Range	Contract Compliance
2"	-----	-----
1 1/2"	-----	-----
1"	100	100
3/4"	90 - 100	87 - 100
No. 4	40 - 70	35 - 75
No. 30	12 - 40	7 - 45
No. 200	3 - 15	0 - 19

Class 3 aggregate base shall also conform to the following quality requirements:

Requirements		
Tests	Operating Range	Contract Compliance
Sand Equivalent	21 Min.	18 Min.
Resistance (R-value)	-----	50 Min.

The requirements of the last 4 paragraphs in Section 26-1.02A, "Class 2 Aggregate Base," of the Standard Specifications shall apply to Class 3 aggregate base.

10-1.36 LEAN CONCRETE BASE

Lean concrete base shall conform to the provisions in Section 28, "Lean Concrete Base," of the Standard Specifications and these special provisions.

Delete the second paragraph of Section 28-1.10, "Payment," of the Standard Specifications.

If the Engineer orders an increase in the specified portland cement content as provided in Section 28-1.01, "Description," of the Standard Specifications, the compensation payable to the Contractor for lean concrete base will be increased on the basis of the cost of cement per ton, f.o.b. the cement mill (including sales tax) plus the freight cost per ton for delivery of the cement to the project from the mill. In determining the cost of the cement, any cash or trade discount offered or available will be credited to the State notwithstanding the fact that the discount may not have been taken by the purchaser.

10-1.37 ASPHALT CONCRETE

Asphalt concrete shall be Type B and shall conform to the provisions in Section 11-1, "Quality Control / Quality Assurance," of these special provisions and these special provisions.

Delete the last sentence of the first paragraph in Section 39-2.01, "Asphalts," of the Standard Specifications.

The amount of asphalt binder to be mixed with the aggregate for asphalt concrete (except Open Graded asphalt concrete) and asphalt concrete base will be determined by the Engineer in accordance with California Test 367 using the samples of aggregates furnished by the Contractor in conformance with Section 39-3.03, "Proportioning." The amount of asphalt binder to be mixed with the aggregate for Open Graded asphalt concrete will be determined by the Engineer in accordance with California Test 368, using the samples of aggregates furnished by the Contractor in conformance with Section 39-3.03.

Delete the second paragraph in Section 39-3.02, "Drying," of the Standard Specifications.

Drying shall continue for a sufficient time and at a sufficiently high temperature that, at the time of spreading, the moisture content of the completed mixture shall not exceed one percent. Moisture content will be determined by California Test 310 or 370.

Delete the last sentence of the second paragraph of Section 39-3.03, "Proportioning," of the Standard Specifications.

The bitumen ratio (pounds of asphalt per 100 pounds of dry aggregate including supplemental fine aggregate, if used) will be determined by the Engineer using California Test 367, or California Test 368 for Open Graded asphalt concrete.

Delete the second paragraph in Section 39-3.05, "Asphalt Concrete and Asphalt Concrete Base Storage," of the Standard Specifications.

Storage silos shall be equipped with a surge-batcher sized to hold a minimum of 4,000 pounds of material. A surge-batcher consists of equipment placed at the top of the storage silo which catches the continuous delivery of the completed mix and changes it to individual batch delivery and prevents the segregation of product ingredients as the completed mix is placed into storage. The surge-batcher shall be center loading and shall be thermally insulated or heated or thermally insulated and heated to prevent material buildup. Rotary chutes shall not be used as surge-batchers.

The surge-batcher shall be independent and distinct from conveyors or chutes used to collect or direct the completed mixture being discharged into storage silos and shall be the last device to handle the material before it enters the silo. Multiple storage silos shall be served by an individual surge-batcher for each silo. Material handling shall be free of oblique movement between the highest elevation (conveyor outfall) and subsequent placement in the silo. Discharge gates on surge-batchers shall be automatic in operation and shall discharge only after a minimum of 4,000 pounds of material has been collected and shall close before the last collected material leaves the device. Discharge gate design shall prevent the deflection of material during the opening and closing operation.

Delete the second paragraph in Section 39-6.02, "Spreading," of the Standard Specifications.

In advance of spreading asphalt concrete over an existing base, surfacing or bridge deck, if there is a contract item for asphalt concrete (leveling) or if ordered by the Engineer, asphalt concrete shall be spread by any mechanical means that will produce a uniform smoothness and texture. Asphalt concrete (leveling) shall include, but is not limited to, the filling and leveling of irregularities and ruts. Asphalt concrete used to change the cross slope or profile of an existing surface shall not be considered as asphalt concrete (leveling).

Surfacing of miscellaneous areas with asphalt concrete shall conform to the provisions in "Asphalt Concrete (Miscellaneous Areas)" of these special provisions.

The aggregate for Type B asphalt concrete shall conform to the 3/4" Maximum, Medium grading specified in Section 39-2.03, "Aggregate," in Section 11-1, "Quality Control / Quality Assurance," of these special provisions.

In addition to the provisions in Section 39-7.01, "Spreading Equipment," in Section 11-1, "Quality Control / Quality Assurance," of these special provisions, asphalt paving equipment shall be equipped with automatic screed controls and a sensing device or devices.

When placing asphalt concrete to lines and grades established by the Engineer, the automatic controls shall control the longitudinal grade and transverse slope of the screed. Grade and slope references shall be furnished, installed, and maintained by the Contractor. Should the Contractor elect to use a ski device, the minimum length of the ski device shall be 30 feet. The ski device shall be a rigid one piece unit and the entire length shall be utilized in activating the sensor.

When placing the initial mat of asphalt concrete on existing pavement, the end of the screed nearest the centerline shall be controlled by a sensor activated by a ski device not less than 30 feet long. The end of the screed farthest from centerline shall be controlled by a sensor activated by a similar ski device.

When paving contiguously with previously placed mats, the end of the screed adjacent to the previously placed mat shall be controlled by a sensor that responds to the grade of the previously placed mat and will reproduce the grade in the new mat within a 0.01-foot tolerance. The end of the screed farthest from the previously placed mat shall be controlled in the same manner the screed was controlled when placing the initial mat.

If the methods and equipment furnished by the Contractor fail to produce a layer of asphalt concrete conforming to the provisions, including straightedge tolerance, in Section 39-8.04, "Compacting," in Section 11-1, "Quality Control / Quality Assurance," of these special provisions, the paving operations shall be discontinued and the Contractor shall modify the equipment or methods, or furnish substitute equipment.

If the automatic screed controls fail to operate properly during a day's work, the Contractor may use manual control of the spreading equipment for the remainder of that day. However, the equipment shall be corrected or replaced with alternative automatically controlled equipment conforming to the requirements in this section before starting another day's work.

If the finished surface of the asphalt concrete on Route 10 and ramp traffic lanes does not meet the specified surface tolerances, the finished surface shall be brought within tolerance by either (1) abrasive grinding (with fog seal coat applied on the areas which have been ground), (2) removal and replacement, or (3) placing an overlay of asphalt concrete. The method will be selected by the Engineer. The corrective work shall be at the Contractor's expense.

If abrasive grinding is used to bring the finished surface to specified surface tolerances, additional grinding shall be performed as necessary to extend the area ground in each lateral direction so that the lateral limits of grinding are at a constant offset from, and parallel to the nearest lane line or pavement edge, and in each longitudinal direction so that the grinding begins and ends at lines normal to the pavement centerline, within a ground area. Ground areas shall be neat rectangular areas of uniform surface appearance. Abrasive grinding shall conform to the provisions in the first paragraph and the last 4 paragraphs in Section 42-2.02, "Construction," of the Standard Specifications.

The area to which paint binder has been applied shall be closed to public traffic. Care shall be taken to avoid tracking binder material onto existing pavement surfaces beyond the limits of construction.

The Contractor shall schedule his paving operations such that each layer of asphalt concrete is placed on all contiguous lanes of a traveled way each work shift. At the end of each work shift, the distance between the ends of the layers of asphalt concrete on adjacent lanes shall not be greater than 10 feet nor less than 5 feet. Additional asphalt concrete shall be placed along the transverse edge at the end of each lane and along the exposed longitudinal edges between adjacent lanes, hand raked, and compacted to form temporary conforms. Kraft paper, or other approved bond breaker, may be placed under the conform tapers to facilitate the removal of the taper when paving operations resume.

Where the existing pavement is to be widened by constructing a new structural section adjacent to the existing pavement, the new structural section, on both sides of the existing pavement, shall be completed to match the elevation of the edge of the existing pavement at each location prior to spreading and compacting asphalt concrete over the adjacent existing pavement.

Additional asphalt concrete surfacing material shall be placed along the edge of the surfacing at road connections, hand raked, if necessary, and compacted to form smooth tapered conforms. Full compensation for furnishing all labor and tools and doing all the work necessary to hand rake said conforms shall be considered as included in the contract prices paid per ton for the various contract items of asphalt concrete surfacing involved and no additional compensation will be allowed therefor.

The aggregate from each separate bin used for asphalt concrete, Type B, except for the bin containing the fine material, shall have a Cleanness Value of 57, minimum, as determined by California Test 227, modified as follows:

Tests will be performed on the material retained on the No. 8 sieve from each bin and will not be a combined or averaged result.

Each test specimen will be prepared by hand shaking for 30 seconds, a single loading of the entire sample on a 12-inch diameter, No. 4 sieve, nested on top of a 12-inch diameter, No. 8 sieve.

Where a coarse aggregate bin contains material which will pass the maximum size specified and be retained on a 3/8 inch sieve, the test specimen weight and volume of wash water specified for 1" x No. 4 aggregate size will be used.

Samples will be obtained from the weigh box area during or immediately after discharge from each bin of the batching plant or immediately prior to mixing with asphalt in the case of continuous mixers.

The Cleanness Value of the test sample from each of the bins will be separately computed and reported.

At drier-drum and continuous plants with cold feed control, Cleanness Value test samples will be obtained from the discharge of each coarse aggregate storage. An aggregate sampling device shall be provided which will provide a 50-pound sample of each coarse aggregate.

10-1.38 ASPHALT CONCRETE (MISCELLANEOUS AREAS)

Surfacing of miscellaneous areas with asphalt concrete shall conform to the provisions for miscellaneous areas in Section 39, "Asphalt Concrete," of the Standard Specifications and these special provisions.

Asphalt concrete placed in miscellaneous areas may be produced in conformance with the requirements for asphalt concrete placed on the traveled way in Section 11-1, "Quality Control / Quality Assurance," of these special provisions.

The amount of asphalt binder used in asphalt concrete placed in dikes and overside drains shall be increased one percent by weight of the aggregate over the amount of asphalt binder determined for use in asphalt concrete placed on the traveled way.

Aggregate for asphalt concrete dikes shall conform to the 3/8 inch maximum grading as specified in Section 39-2.02, "Aggregate," of the Standard Specifications.

The miscellaneous areas to be paid for at the contract price per square yard for place asphalt concrete (miscellaneous area) in addition to the prices paid for the materials involved shall be limited to the areas listed on the plans.

Asphalt concrete placed in miscellaneous areas will be paid for at the contract price per ton for asphalt concrete specified in Section 11-1, "Quality Control / Quality Assurance," of these special provisions. Section 39-10.02, "Statistical Evaluation and Determination of Pay Factor," in Section 11-1, "Quality Control / Quality Assurance," of these special provisions, shall not apply to asphalt concrete placed in miscellaneous areas. Payment for placing asphalt concrete in miscellaneous areas and dikes will be as specified in Section 39-8.02, "Payment," of the Standard Specifications.

10-1.39 ASPHALT CONCRETE (BRIDGE)

Asphalt concrete (bridge) shall be Type B and shall conform to the provisions in Section 39, "Asphalt Concrete," of the Standard Specifications and these special provisions.

The aggregate for use in the asphalt concrete (bridge) shall conform to the provisions in Section 39-2.02, "Aggregate," of the Standard Specifications, and the following:

The grading of the aggregate shall be 1/2 inch maximum, medium.

The grading of the aggregate in sections or tapers at bridge ends, less than one inch in total depth, may be No. 4 maximum, subject to the approval of the Engineer.

The amount of asphalt binder to be mixed with the aggregate shall be between 4 percent and 7 percent by weight of the dry aggregate as determined by the Engineer.

Paint binder shall be SS1 type asphaltic emulsion.

Paint binder shall be applied at a rate of from 0.04- to 0.07-gallon per square yard of surface covered. The exact rate of application will be determined by the Engineer.

Whenever concrete expansion dams are to be placed at bridge deck expansion joints, oil resistant construction paper shall be taped to the deck over the area to be covered by the dams prior to placing the paint binder and asphalt concrete across the joint.

At no time shall the difference in grade between adjacent lanes that are open to public traffic exceed 0.15-foot.

Asphalt concrete (bridge) will be measured and paid for by the ton.

Full compensation for furnishing and taping oil resistant construction paper at bridge deck expansion joints shall be considered as included in the contract price paid per ton for asphalt concrete (bridge) and no additional compensation will be allowed therefor.

10-1.40 CONCRETE PAVEMENT (UNDOWELED TRANSVERSE WEAKENED PLANE JOINTS)

GENERAL

Portland cement concrete pavement shall conform to the provisions in Section 40, "Portland Cement Concrete Pavement," of the Standard Specifications and these special provisions.

Insert method for forming joints in pavement shall not be used.

The repeated interval spacing and angle of transverse weakened plane joints shall match the existing spacings and angles of the existing adjoining concrete pavement.

MATERIALS

Tie Bars

Tie bars shall be deformed reinforcing steel bars conforming to the requirements of ASTM Designation: A 615/A 615M, Grade 300 or 420, and shall be epoxy-coated in conformance with the provisions in Section 52-1.02B, "Epoxy-coated

Reinforcement," of the Standard Specifications, except that references made to ASTM Designation: D 3963/D 3963M shall be deemed to mean ASTM Designation: A 934/A 934M or A 775/A 775M. Tie bars shall not be bent.

Epoxy

If used, epoxy resin to bond tie bars to existing concrete shall conform to Section 95-2.03, "Epoxy Resin Adhesive for Bonding New Concrete to Old Concrete," of the Standard Specifications.

Asphalt Rubber Joint Sealant

Asphalt rubber joint sealant shall conform to the requirements of ASTM Designation: D 3405 as modified herein or to the following:

1. Asphalt rubber joint sealant shall be a mixture of paving asphalt and ground rubber. Ground rubber shall be vulcanized or a combination of vulcanized and devulcanized materials ground so that 100 percent will pass a No. 8 sieve. The mixture shall contain not less than 22 percent ground rubber, by mass. Modifiers may be used to facilitate blending.
2. The asphalt rubber sealant shall have a Ring and Ball softening point of 135° F. minimum, when tested in conformance with the requirements in AASHTO Designation: T 53.
3. The asphalt rubber sealant material shall be capable of being melted and applied to cracks and joints at temperatures below 400° F.

The penetration requirement of Section 4.2 of ASTM Designation: D 3405 shall not apply. The required penetration at 77° F, 5.3 ounces, 5s, shall not exceed 120.

The resilience requirement of Section 4.5 of ASTM Designation: D 3405 shall not apply. The required resilience, when tested at 77° F, shall have a minimum of 50 percent recovery.

Each lot of asphalt rubber joint sealant shipped to the job site, whether as specified herein or conforming to the requirements of ASTM Designation: D 3405, as modified herein, shall be accompanied by a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, and shall be accompanied with storage and heating instructions and precautionary instructions for use. The Certificate of Compliance shall be provided to the Engineer.

Asphalt rubber joint sealant materials shall be heated and placed in conformance with the manufacturer's written instructions and the details shown on the plans. The manufacturer's instructions shall be provided to the Engineer. Asphalt rubber joint-sealant materials shall not be placed when the pavement surface temperature is below 50° F.

Backer Rods

Backer rods shall have a diameter prior to placement at least 25 percent greater than the width of the saw cut after sawing and shall be expanded, crosslinked, closed-cell polyethylene foam that is compatible with the joint sealant so that no bond, adverse reaction occurs between the rod and sealant. In no case shall the Contractor use a hot pour sealant that will melt the backer rod. The Contractor shall submit a manufacturer's data sheet verifying that the backer rod is compatible with the sealant to be used.

SUBMITTALS

Samples of the following materials used in the work shall be submitted for the Engineer's approval, 10 days prior to installation or placement of the materials:

Tie Bars
Epoxy
Joint Sealant
Backer Rods

INSTALLING TIE BARS

Tie bars shall be installed at longitudinal contact joints, longitudinal weakened plane joints, and transverse contact joints as shown on the plans. In no case, shall any consecutive width of new portland cement concrete pavement tied together with tie bars exceed 15 meters. In no case shall tie bars be used at a joint where portland cement concrete and asphalt concrete pavements abut.

Tie bars shall be installed at longitudinal joints by one of the 3 following methods:

1. Drilling and bonding tie bars with epoxy shall conform to the details shown on the plans. The epoxy shall be a two-component, epoxy-resin, conforming to the requirements of ASTM Designation: C881, Type V, Grade 3 (Non-Sagging), and Class B. Epoxy shall be accompanied by a Certificate of compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. A copy of the manufacturer's recommended installation procedure shall be provided to the Engineer at least 7 days prior to the start of work. The drilled holes shall be cleaned in accordance with the epoxy manufacturer's instructions and shall be dry at the time of placing the epoxy and tie bars. Immediately after inserting the tie bars into the epoxy, the tie bars shall be supported as necessary to prevent movement during the curing and shall remain undisturbed until the epoxy has cured a minimum time as specified by the manufacturer. Tie bars that are improperly bonded, as determined by the Engineer, will be rejected. If rejected, adjacent new holes shall be drilled, as directed by the Engineer, and new tie bars shall be placed and securely bonded to the concrete. All work necessary to correct improperly bonded tie bars shall be performed at the Contractor's expense.
2. By inserting the tie bars into the plastic slipformed concrete before finishing the concrete. Inserted tie bars shall have full contact between the bar and the concrete. When tie bars are inserted through the pavement surface, the concrete over the tie bars shall be reworked and refinished to such an extent that there is no evidence on the surface of the completed pavement that there has been any insertion performed. Any loose tie bars shall be replaced by drilling and grouting into place with epoxy as described in Method 1 above at the Contractor's expense.
3. By using threaded dowel splice couplers fabricated from deformed bar reinforcement material, free of external welding or machining. Threaded dowel splice couplers shall be accompanied by a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, and shall be accompanied with installation instructions. The Certificate of Compliance shall be provided to the Engineer. Installation of threaded dowel splice couplers shall conform to the requirements of the manufacturer's recommendations.

LIQUID JOINT SEALANT INSTALLATION

The joint sealant detail for transverse and longitudinal joints, as shown on the plans, shall apply only to weakened plane joints. Weakened plane joints shall be constructed by the sawing method. Should grinding or grooving be required over or adjacent to any joint after sealant has been placed, the joint materials shall be completely removed and disposed of, and replaced at the Contractor's expense. Joints shall have a sealant recessed below the final finished surface as shown on the plans.

At the Contractor's option, transverse weakened plane joints shall be either Type DSC or Type SSC as shown on the plans. Longitudinal weakened plane joints shall be Type SSC only as shown on the plans.

Seven days after the concrete pavement placement and not more than 4 hours before placing backer rods and joint sealant materials, the joint walls shall be cleaned by the dry sand blast method and other means as necessary to completely remove from the joint all objectionable material such as soil, asphalt, curing compound, paint and rust. After cleaning the joint, all traces of sand, dust and loose material shall be removed from and near the joint for a distance along the pavement surfaces of at least 2 inches on each side of the joint by the use of a vacuum device. Surface moisture shall be removed at the joints by means of compressed air or moderate hot compressed air or other means approved by the Engineer. Drying procedures that leave a residue or film on the joint wall shall not be used. Sandblasting equipment shall have a maximum nozzle diameter size of 0.24-inch±0.039-inch and a minimum pressure of 90 psi.

Backer rod shall be installed as shown on the plans and shall be an expanded, closed-cell polyethylene foam that is compatible with the joint sealant so that no bond or adverse reaction occurs between the rod and sealant. Backer rod shall be installed when the temperature of the portland concrete pavement is above the dew point of the air and when the air temperature is 4°C or above. Backer rod shall be installed when the joints to be sealed have been properly patched, cleaned and dried, as determined by the Engineer. Methods of placing backer rod that leave a residue or film on the joint walls, shall not be used.

Immediately after placement of the backer rod, joint sealant shall be placed in the clean, dry, prepared joints as shown on the plans. The joint sealant shall be applied by a mechanical device with a nozzle shaped to fit inside the joint to introduce the sealant from inside the joint. Adequate pressure shall be applied to the sealant to ensure that the sealant material is extruded evenly and that full continuous contact is made with the joint walls. After application of the sealant the surface of the sealant shall be recessed as shown on the plans.

Any failure of the joint material in either adhesion or cohesion of the material will be cause for rejection of the joint. The finished surface of joint sealant shall conform to the dimensions and allowable tolerances shown on the plans. Rejected joint materials or joint material whose finished surface does not conform to the dimensions shown on the plans, as determined by the Engineer, shall be repaired or replaced, at the Contractor's expense, with joint material that conforms to the requirements.

After each joint is sealed, all surplus joint sealer on the pavement surface shall be removed. Traffic shall not be permitted over the sealed joints until the sealant is tack free and set sufficiently to prevent embedment of roadway debris into the sealant.

CONSTRUCTING TRANSVERSE CONTACT JOINTS

A transverse contact (construction) joint shall be constructed at the end of each day's work or where concrete placement is interrupted for more than 30 minutes, to coincide with the next weakened plane joint location.

If sufficient concrete has not been mixed to form a slab to match the next weakened plane joint, when an interruption occurs, the excess concrete shall be removed and disposed of back to the last preceding joint. The cost of removing and disposing of any excess concrete shall be at the Contractor's expense. Any excess material shall become the property of the Contractor and shall be properly disposed of.

A metal or wooden bulkhead (header) shall be used to form the joint. The bulkhead shall be designed to accommodate the installation of tie bars.

MEASUREMENT AND PAYMENT

Sealing longitudinal and transverse weakened plane joints in portland cement concrete pavement will be measured by the linear foot.

The contract price paid per meter for seal pavement joint shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in sealing pavement joints complete in place, including sawing, cleaning and preparing the joints in the concrete pavement, furnishing and installing backer rod, repairing and patching spalled or raveled sawed joints, and replacing or repairing rejected joints, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for furnishing and placing epoxy-coated tie bars in portland cement concrete pavement shall be considered as included in the contract price paid per cubic yard for concrete pavement and no separate payment will be made therefor.

Full compensation for drilling holes, bonding tie bars with epoxy resin, and placing threaded dowel splice couplers shall be considered as included in the contract price paid per cubic yard for concrete pavement and no additional compensation will be allowed therefor.

10-1.41 PILING

General

Piling shall conform to the provisions in Section 49, "Piling," of the Standard Specifications, and these special provisions.

Unless otherwise specified, welding of any work performed in conformance with the provisions in Section 49, "Piling," of the Standard Specifications, shall be in conformance with the requirements in AWS D1.1.

Foundation recommendations are included in the "Information Handout" available to the Contractor as provided for in Section 2-1.03, "Examination of Plans, Specifications, Contract, and Site of Work," of the Standard Specifications.

Attention is directed to "Welding Quality Control" of these special provisions.

Attention is directed to "Public Safety" of these special provisions. Before performing pile handling or pile installation operations at a location that is closer than the length of the pile being handled or installed to the edge of areas open to public traffic or public use, the Contractor shall submit to the Engineer in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, a detailed plan describing the measures that will be employed to provide for the safety of traffic and the public.

The second paragraph in Section 49-1.03, "Determination of Length," of the Standard Specifications is amended to read:

For driven piling, the Contractor shall furnish piling of sufficient length to obtain both the specified tip elevation and design load shown on the plans or specified in the special provisions. For cast-in-drilled-hole concrete piling, the Contractor shall construct piling of such length to develop the compression nominal resistance and to obtain the specified tip elevation shown on the plans or specified in the special provisions.

At the Contractor's option, the Contractor may conduct additional foundation investigation, including installing and axial load testing additional non-production indicator piling. The Engineer shall approve locations of additional foundation testing. The Contractor shall notify the Engineer at least 5 working days prior to beginning additional foundation investigation.

Additional foundation investigation shall be completed prior to requesting revised specified pile tip elevations or modification to the installation methods specified herein. Revisions to specified tip elevations and modifications to the specified installation methods will be subject to the provisions of Section 5-1.14, "Cost Reduction Incentive."

Modification to the specified installation methods and specified pile tip elevation will not be considered at locations where lateral load demands control design pile tip elevations or when the plans state that specified pile tip elevation shall not be revised.

The pile structural capacity design is based on the nominal strength as defined in Caltrans Bridge Design Specifications (Article 8.1.3) or the nominal resistance as defined in the LRFD Bridge Design Specifications (Article 1.3.2.1). The nominal resistance of the pile, as shown on the plans, is the design capacity required to resist the factored axial load demands.

Indicator compression pile load testing shall conform to the requirements of ASTM Designation: D 1143. The acceptance criteria for compression pile load testing shall be as follows:

The pile shall sustain the first compression test load applied which is equal to the nominal compression resistance, as shown on the plans, with no more than 0.5-inch total vertical movement at the top of the pile measured relative to the top of the pile prior to the start of compression load testing.

Indicator tension pile load testing shall conform to the requirements of ASTM Designation: D 3689. The loading apparatus described as "Load Applied to Pile by Hydraulic Jack(s) Acting at One End of Test Beam(s) Anchored to the Pile" shall not be used. The acceptance criteria for tension pile load testing shall be as follows:

The pile shall sustain the first tension test load applied which is equal to the nominal tension resistance, as shown on the plans, with no more than 0.5-inch total vertical movement at the top of the pile measured relative to the top of the pile prior to the start of tension load testing.

Indicator piling shall be removed in conformance with the requirements in Section 15-4.02, "Removal Methods," and the remaining holes shall be backfilled with earth or other suitable material approved by the Engineer.

Section 49-1.04, "Test Piles," of the Standard Specifications is amended to read:

49-1.04 Load Test Piles.—When load test piles and anchor piles are shown on the plans or specified for a structure, the loading tests using those piles shall be completed before the remaining piles for that structure or specified control location are drilled, cast, cut to length, or driven.

Load test piles shall be installed with the same type of equipment that is to be used for installation of foundation piles.

Load test piles which are shown on the plans or specified in the special provisions shall conform to the requirements for piling as specified in these specifications and, unless otherwise shown, shall be so located that they may be cut off and become a part of the completed structure.

Load test piles which are not to be incorporated in the completed structure shall be removed in conformance with the requirements in Section 15-4.02, "Removal Methods," and the remaining holes shall be backfilled with earth or other suitable material approved by the Engineer.

Load test anchorages in piles used as anchor piles shall conform to the following requirements:

High strength threaded steel rods shall conform to the provisions for bars in Section 50-1.05, "Prestressing Steel," except Type II bars shall be used.

High strength steel plates shall conform to the requirements in ASTM Designation: A 709, Grade 50.

Anchor nuts shall conform to the provisions in the second paragraph in Section 50-1.06, "Anchorages and Distribution."

The Contractor, at the Contractor's expense, may use additional cement or Type III cement in the concrete for the load test and anchor piles.

Testing of load test piles shown on the plans and specified in the special provisions will be performed by the Engineer without cost to the Contractor. The loading tests will be made when the concrete in the load test and anchor piles has developed a compressive strength of at least 2,000 pounds per square inch. The Engineer will require not more than 5 working days to perform each load test.

Should the Engineer fail to complete the load tests within the time specified in the special provisions and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in load testing of piles, the delay will be considered a right of way delay as specified in Section 8-1.09, "Right of Way Delays."

The Contractor shall furnish labor, materials, tools, equipment, and incidentals as required to assist the Engineer in the installation, operation and removal of State-furnished steel load test beams, State-furnished jacks, bearing plates, drills, and other test equipment. This work will be paid for as extra work as provided in Section 4-1.03D.

The first and second paragraphs in Section 49-1.05, "Driving Equipment," of the Standard Specifications are amended to read:

49-1.05 Driving Equipment.—Driven piles shall be installed with impact hammers that are approved in writing by the Engineer. Impact hammers shall be steam, hydraulic, air, or diesel hammers. Impact hammers shall develop sufficient energy to drive the piles at a penetration rate of not less than 1/8 inch per blow at the specified bearing value.

Vibratory hammers shall not be used for installation of piles, unless otherwise shown on the plans or specified in the special provisions.

Hammers with an external combustion engine that are not single action, shall have a transducer that records ram velocity.

Double acting diesel hammers with internal combustion engines shall have a transducer that records bounce chamber pressure.

For hammers with no visual way of observing the ram stroke, a printed readout showing hammer energy during driving operation shall be provided to the Engineer by the Contractor.

The fifth paragraph in Section 49-1.05, "Driving Equipment," of the Standard Specifications is deleted.

Section 49-1.05, "Driving Equipment," of the Standard Specifications is amended by adding the following paragraph after the seventh paragraph:

The use of followers or underwater hammers for driving piles will be permitted if authorized in writing by the Engineer. When a follower or underwater hammer is used, its efficiency shall be verified by furnishing the first pile in each bent or footing sufficiently long and driving the pile without the use of a follower or underwater hammer.

At the option of the Contractor, vibratory hammers or oscillators may be used to install temporary casings.

Difficult pile installation is anticipated due to the presence of dense soils, underground utilities, overhead utilities, sound control, and traffic control.

The first and second paragraphs of Section 49-4.01, "Description," of the Standard Specifications are amended to read:

Cast-in-place concrete piles shall consist of one of the following:

1. Steel shells driven permanently to the required bearing value and penetration and filled with concrete.
2. Steel casings installed permanently to the required penetration and filled with concrete.
3. Drilled holes filled with concrete.
4. Rock sockets filled with concrete.

The drilling of holes shall conform to the provisions in these specifications. Concrete filling for cast-in-place concrete piles is designated by compressive strength and shall have a minimum 28-day compressive strength of 3625 psi. At the option of the Contractor, the combined aggregate grading for the concrete shall be either the 1-inch maximum grading, the 1/2-inch maximum grading, or the 3/8-inch maximum grading. Concrete shall conform to the provisions in Section 90, "Portland Cement Concrete," and Section 51, "Concrete Structures." Reinforcement shall conform to the provisions in Section 52, "Reinforcement."

The first sentence of the first paragraph in Section 49-1.08, "Bearing Value and Penetration," of the Standard Specifications is amended to read:

49-1.08 Bearing Value and Penetration.—Except for piles to be load tested, driven piles shall be driven to a bearing value of not less than the design loading shown on the plans unless otherwise specified in the special provisions or permitted in writing by the Engineer.

The third through seventh paragraphs in Section 49-1.08, "Bearing Value and Penetration," of the Standard Specifications are amended to read:

The bearing values for driven piles shall be determined from the following formula in which "P" is the design loading shown on the plans in pounds, "E" is the manufacturer's rating for foot-pounds of energy developed by the hammer, and "s" is the penetration per blow in inches, averaged over the last few blows.

$$P =$$

The penetration per blow "s" shall be measured only when there is no appreciable rebound of the hammer and only when the last blow is struck on a sound pile head or driving block. The penetration per blow "s" may be measured either during initial driving or during redriving following a set period as determined by the Engineer.

Section 49-1.10, "Load Testing," of the Standard Specifications is deleted.

The third paragraph in Section 49-2.03, "Requirements," of the Standard Specifications is amended to read:

Untreated and treated timber piles shall be of Douglas fir or Southern Pine timber and shall be clean peeled.

The third paragraph in Section 49-4.04, "Steel Shells," of the Standard Specifications is amended to read:

Steel shells shall conform to the provisions for steel pipe piles specified in Section 49-5, "Steel Piles."

Section 49-5.01, "Description," of the Standard Specifications is amended to read:

49-5.01 Description.—Steel piles shall include structural shape piles and pipe piles. Structural shape steel piles shall be of the rolled section shown on the plans or of the section specified in the special provisions and shall be structural steel conforming to the specifications of ASTM Designation: A 36/A 36M, or at the option of the Contractor, structural steel conforming to the specifications of ASTM Designation: A 572/A 572M.

Steel pipe piling shall conform to the following requirements:

1. Piles shall be of the nominal diameter and the nominal wall thickness as the pipe piles shown on the plans unless otherwise specified in the special provisions.
2. The carbon equivalency (CE) as defined in AWS D 1.1, Section XI5.1, shall not exceed 0.45.
3. The sulfur content shall not exceed 0.05 percent.
4. Piles shall conform to any additional requirements in the special provisions, including but not limited to, tolerances for diameter, edge alignment, end match marking, roundness, and straightness, that are required in order to conform with steel pile splice welding and welding inspection provisions.
5. Steel pipe pile seams shall be complete penetration welds and shall conform to the requirements of AWS D1.1 and any additional amendments to AWS D1.1 listed herein and in the special provisions. Incomplete penetration welds and defective welds of steel pipe piles shall be repaired or restored to achieve complete joint penetration groove welds.
6. Steel pipe piles that are less than 14 inches in diameter shall conform to the specifications of ASTM Designation: A 252, Grade 2 or 3, and steel pipe piles that are 14 inches and greater in diameter shall conform to the specifications of ASTM Designation: A 252, Grade 3, as amended by the above requirements.

Steel piles shall not be joined by welded lap splicing.

The manufacturer or fabricator of steel piling shall furnish a Certificate of Compliance stating that the piling being supplied conforms to these specifications and to the special provisions. The Certificate of Compliance shall include test reports for tensile, chemical, and any specified nondestructive tests. Samples for testing shall be taken from the base metal, steel, coil or from the manufactured or fabricated piling.

Section 49-5.02, "Splicing," of the Standard Specifications is amended to read:

49-5.02 Splicing.—Steel pile splices shall conform to the requirements of AWS D 1.1 and the special provisions. Structural shape steel piling splices shall be complete joint penetration groove welds. Steel pipe pile splices that are made at a permanent manufacture or fabrication facility, and that are made prior to furnishing the Certificate of

Compliance shall be complete penetration welds. Steel pipe pile splices that are made in the field shall be complete joint penetration groove welds.

Ends of steel pipe piling to be spliced that have been damaged during driving shall be removed to a sound and uniform section conforming to the tolerances for diameter, edge alignment and roundness required to meet the steel pile splice welding requirements. Pipe ends shall be field cut using automated guided cutting equipment. Manual flame cutting shall not be used.

Alternative "X" precast concrete piling at East El Monte Overhead (Widen) (Br. No. 53-0867), Cogswell Road Undercrossing (Widen) (Br. No. 53-0662), Peck Road Undercrossing (Widen) (Br. No. 53-0661), and Valley Boulevard Undercrossing (Widen) (Br. No. 53-0660), shall have a dimension, T, not less than 14 inches.

Note 3 on converted 1999 Standard Plan B2-5 is deleted.

Note 5 on converted 1999 Standard Plan B2-8 is deleted.

STEEL PIPE PILING

General

Wherever reference is made to the following American Petroleum Institute (API) specifications in the Standard Specifications, on the project plans, or in these special provisions, the year of adoption for these specifications shall be as follows:

API Codes	Year of Adoption
API 2B	1990
API 5L	1995

Only steel pipe pile seam welds may be made by the electric resistance welding method. Such welds shall be welded in conformance with the requirements in API 5L and any amendments to API 5L in the Standard Specifications or these special provisions.

Seams in steel pipe piles made by submerged arc welding may be welded in conformance with the requirements in API 5L and any amendments to API 5L in the Standard Specifications or these special provisions.

Handling devices may be attached to steel pipe piling. Welds attaching these devices shall be aligned parallel to the axis of the pile and shall conform to the requirements for field welding specified herein. Permanent bolted connections shall be corrosion resistant. Prior to making attachments, the Contractor shall submit a plan to the Engineer that includes the locations, handling and fitting device details, and connection details. Attachments shall not be made to the steel pipe piling until the plan is approved in writing by the Engineer. The Engineer shall have 7 days to review the plan. Should the Engineer fail to complete the review within this time allowance, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the plan, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

Each length of steel pipe piling shall be marked in conformance with the requirements in ASTM Designation: A 252.

For steel pipe piling, including any bar reinforcement in the piling, the Engineer shall be allowed 48 hours to review the "Welding Report," specified in "Welding Quality Control" of these special provisions, and respond in writing after all the required items have been received. No field welded steel pipe piling shall be installed, and no reinforcement in the piling shall be encased in concrete until the Engineer has approved the above requirements in writing. Should the Engineer fail to complete the review and provide notification within this time allowance, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in notification, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

At the Contractor's option, a steel pipe pile may be re-tapped to prevent pile set-up; however, the field welded splice shall remain at least 3 feet above the work platform until that splice is approved in writing by the Engineer.

Manufactured Steel Pipe

Manufactured steel pipe is defined as pipe that is produced at a permanent facility where an automatic welding process, electric resistance welder, or seamless pipe operation is used in conformance with ASTM Designations: A 252, A 53, A 135, A 139, API 5L, or AWWA C200; where this steel pipe can be produced in lengths at least 30 feet long without a circumferential splice; and where this manufacturing can be done on a daily basis. Manufactured steel pipe is not a specifically engineered product. (i.e. Manufactured steel pipe is an "off the shelf" item.)

Manufactured steel pipe used for steel pipe piling shall conform to the following requirements:

- A. The outside circumference of the steel pipe piling end shall not vary by more than 0.375-inch from that corresponding to the diameter shown on the plans.
- B. The maximum allowable misalignment for adjacent steel pipe pile edges to be welded shall be 0.1875 times the wall thickness, but not more than 0.063-inch.
- C. Steel pipe pile straightness shall conform to the requirements in API 5L, Section 7.6, "Straightness."
- D. Welds made at a permanent manufacturing facility shall be made by either an automatic welding process or an electric resistance welding process.

Fabricated Steel Pipe

Fabricated steel pipe is defined as pipe produced at a permanent facility where a variety of steel fabrication including roll forming and welding steel plate into pipe is performed, where this pipe is at least 3/4-inch in wall thickness, where this pipe is produced in conformance with API 2B, and where this fabrication can be done on a daily basis. Fabricated steel pipe is a specifically engineered product. (i.e., Fabricated steel pipe is engineered for a specific project.)

Fabricated steel pipe used for steel pipe piling shall conform to API 2B and the following requirements:

- A. An API site license and API monogram are not required.
- B. Weld filler metal shall conform to the requirements of AWS D1.5 for the welding of ASTM Designation: A 709, Grade 50 steel, except that the qualification, pretest, and verification test requirements need not be conducted if certified test reports are provided for the consumables to be used.

Field Welding

Field welding of steel piling is defined as welding performed after the certificate of compliance has been furnished by the manufacturer or fabricator and shall conform to the following requirements:

- A. Match marking of pipe ends at the manufacturing or fabrication facility is recommended for piling to ensure weld joint fit-up. Prior to positioning any 2 sections of steel pipe to be spliced by field welding, including those that have been match marked at the manufacturing or fabrication facility, the Contractor shall equalize the offsets of the pipe ends to be joined and match mark the pipe ends.
- B. Welds made in the flat position or vertical position (where the longitudinal pipe axis is horizontal) shall be single-vee groove welds. Welds made in the horizontal position (where the longitudinal pipe axis is vertical) shall be single-bevel groove welds. Joint fit-ups shall conform to the requirements for tubular sections in AWS D1.1 and these special provisions.
- C. The minimum thickness of the backing ring shall be 1/4-inch, and the ring shall be continuous. All splices in the backing ring shall be made by complete penetration welds. These welds shall be completed and inspected prior to final insertion into a pipe end. Attachment of backing rings to pipe ends shall be done using the minimum size and spacing of tack welds that will securely hold the backing ring in place. Tack welding shall be done in the root area of the weld splice. Cracked tack welds shall be removed and replaced prior to subsequent weld passes. The gap between the backing ring and the steel pipe piling wall shall be no greater than 1/16-inch. One localized portion of the splice, that is equal to or less than a length that is 20 percent of the outside circumference of the pipe, as determined by the Engineer, may be offset by a gap equal to or less than 1/4-inch provided that this localized portion is first seal welded using shielded metal arc E7016 or E7018 electrodes. The Contractor shall mark this localized portion so that it can be referenced during any required nondestructive testing (NDT). Backing rings shall have a minimum width of 1 1/2 times the thickness of the pile to be welded so that they will not interfere with the interpretation of the NDT.
- D. For steel pipe with an outside diameter greater than 42 inches, and with a wall thickness greater than 1 inch, the root opening tolerances may be increased to a maximum of 3/16-inch over the specified tolerances.
- E. Weld filler metal shall conform to the requirements shown in AWS D1.5 for the welding of ASTM Designation: A 709, Grade 50 steel, except that the qualification, pretest, and verification test requirements need not be conducted if certified test reports are provided for the consumables to be used.
- F. For field welding, including attaching backing rings and making repairs, the preheat and interpass temperature shall be in conformance with AWS D1.1, Section 3.5, "Minimum Preheat and Interpass Temperature Requirements," and with Table 3.2, Category C; and the minimum preheat and interpass temperature shall be 150° F, regardless of the pipe pile wall thickness or steel grade. In the event welding is disrupted, preheating to 150° F must occur before welding is resumed.
- G. Welds shall not be water quenched. Welds shall be allowed to cool unassisted.

In addition to the provisions in Section 49-1.05, "Driving Equipment," of the Standard Specifications, should obstructions to driving be encountered, the Contractor shall provide special driving tips or heavier pile sections, or shall subexcavate below the bottom of footing, or take other measures to prevent damage to the pile during driving. Full compensation for providing special tips, heavier sections, or for subexcavating or employing other measures to prevent damage to the piles shall be considered as included in the contract price paid per unit for drive steel pile of the size shown on the plans and no additional compensation will be allowed therefor.

Jetting and Drilling

Jetting to obtain the specified penetration in conformance with the provisions in Section 49-1.05, "Driving Equipment," of the Standard Specifications shall not be used for driven type piles.

Drilling to obtain the specified penetration in conformance with the provisions in Section 49-1.05, "Driving Equipment," of the Standard Specifications shall only be used for driven type piles at the locations and to the bottom of jet or hole elevations listed in the following table. Materials resulting from drilling holes shall be disposed of in conformance with the provisions in Section 19-2.06, "Surplus Material," of the Standard Specifications.

Bridge Name or Number	Abutment Number	Bent Number	Elevation Bottom of Hole
53-0660	1 and 3	Not Allowed	265
53-0661	1 and 3	Not Allowed	260
53-0662	1 and 2	N/A	267
53-0867	1 Right Widen	Not Allowed	270
53-0867	3 Left Widen	Not Allowed	270
53-1030	1 and 2 Left Widen	N/A	280
53-1303	1 and 2 Right Widen	N/A	275

CAST-IN-DRILLED HOLE CONCRETE PILING

Cast-in-drilled-hole concrete piling shall conform to the provisions in Section 49-4, "Cast-In-Place-Concrete Piling," of the Standard Specifications and these special provisions.

The provisions of "Welding Quality Control" of these special provisions shall not apply to temporary steel casings.

Materials

Concrete filling for cast-in-place concrete piles is designated by compressive strength and shall have a minimum 28-day compressive strength of 3500 pounds per square inch. The combined aggregate grading for the concrete shall be the 1" maximum grading.

Gradations proposed by the Contractor for cast-in-drilled-hole concrete piling shall be within the following percentage passing limits:

Primary Aggregate Nominal Size	Sieve Sizes	Limits of Proposed Gradation
1" x No. 4	3/4"	52 - 85
1" x No. 4	3/8"	15 - 38
1/2" x No. 4	3/8"	40 - 78
3/8" x No. 8	3/8"	50 - 85

The grading requirements for coarse aggregates for cast-in-drilled-hole concrete piling are shown in the following table for each size of coarse aggregate:

Sieve Sizes	Percentage Passing Primary Aggregate Nominal Sizes					
	1"x No. 4		1/2"x No. 4		3/8" x No. 8	
	Operating Range	Contract Compliance	Operating Range	Contract Compliance	Operating Range	Contract Compliance
1-1/2 inch	100	100				
1 inch	88 - 100	86 - 100				
3/4-inch	X ± 15	X ± 22	100	100		
1/2-inch			82 - 100	80 - 100	100	100
3/8-inch	X ± 15	X ± 22	X ± 15	X ± 22	X ± 15	X ± 20
No. 4	0 - 16	0 - 18	0 - 15	0 - 18	0 - 25	0 - 28
No. 8	0 - 6	0 - 7	0 - 6	0 - 7	0 - 6	0 - 7

The combined aggregate grading used in concrete for cast-in-drilled-hole concrete piling shall be either the 1-inch maximum grading, the 1/2-inch maximum grading, or the 3/8-inch maximum grading:

Grading Limits of Combined Aggregate			
Sieve Sizes	Percentage Passing		
	1" Maximum	1/2" Maximum	3/8" Maximum
1-1/2 inch	100		
1 inch	90-100		
3/4-inch	55-100	100	100
1/2-inch		90 - 100	100
3/8-inch	45 - 75	55 - 86	50 - 100
No. 4	35 - 60	45 - 63	45 - 63
No. 8	27 - 45	35 - 49	35 - 49
No. 16	20 - 35	25 - 37	25 - 37
No. 30	12 - 25	15 - 25	15 - 25
No. 50	5 - 15	5 - 15	5 - 15
No. 100	1 - 8	1 - 8	1 - 8
No. 200	0 - 4	0 - 4	0 - 4

All references in the Standard Specifications to the aggregate grading tables in Section 90-3, "Aggregate Gradings, " of the Standard Specifications, shall also apply to the aggregate grading tables specified herein.

The fourth paragraph in Section 49-4.01, "Description," of the Standard Specifications is amended to read:

Cast-in-place concrete piles shall be constructed so that the excavation methods and the concrete placement procedures shall provide for placing the concrete against undisturbed material in a dry or dewatered hole.

The concrete filling for cast-in-place concrete piles shall be dense and homogeneous. The methods used to place the concrete shall prevent segregation. Concrete placed in steel shells, dry drilled holes or dewatered drilled holes shall not be permitted to fall from a height greater than 8 feet without the use of adjustable length pipes or tubes unless the flow of concrete is directed into the center of the hole using a hopper and not allowed to strike the reinforcement, reinforcement bracing and other objects in the hole.

Concrete filling for cast-in-place concrete piles shall be vibrated in the upper 15 feet of the pile.

Section 51-1.10, "Concrete Deposited Under Water," shall not apply to cast-in-drilled-hole piling.

The first paragraph of Section 49-4.03, "Drilled Holes," of the Standard Specifications is amended to read:

Except for cast-in-place piling for soundwalls and retaining walls, when cast-in-place concrete piling is less than 24 inches in diameter, the Contractor may propose to increase the diameter and revise the pile tip elevation. The Contractor may propose to increase the diameter of cast-in-place piling for soundwalls and retaining walls, but the pile tip elevations shall not be revised. No additional compensation for delays will be allowed for the Contractor's use of increased diameter cast-in-place concrete piling.

The second through eighth paragraphs of Section 49-4.03, "Drilled Holes," of the Standard Specifications are amended to read:

The axis of the hole shall not deviate from plumb more than 1 1/2 inches per 10 feet of length.

Care shall be taken during excavation to prevent disturbing the foundation material surrounding the pile. Equipment or methods used for excavating holes shall not cause quick soil conditions or cause scouring or caving of the hole. After excavation is begun, the pile shall be constructed in a continuous and expeditious manner in order to prevent deterioration of the surrounding foundation material from air slaking or from the presence of water. Deteriorated foundation material, including material that has softened, swollen or degraded, shall be removed from the sides and the bottom of the hole and shall be disposed of. The bottom of the drilled hole shall be cleaned just before placing reinforcement or concrete to remove any loose sand, gravel, dirt, and drill cuttings.

After placing reinforcement and prior to placing concrete in the drilled hole, if caving occurs or deteriorated foundation material accumulates on the bottom of the hole, the bottom of the drilled hole shall be cleaned. The Contractor shall verify that the bottom of the drilled hole is clean.

Water that has infiltrated the hole shall be removed before placing concrete therein except when concrete is deposited under slurry. Fluvial or drainage water shall not be permitted to enter the hole.

Temporary steel casings shall be furnished and placed tight in the hole where shown on the plans and where necessary to control water or to prevent quick soil conditions or caving of the hole. Temporary casing shall be watertight and of sufficient strength to withstand the loads from installation, removal, lateral concrete pressures and earth pressures. The casing shall be non-corrugated and the surfaces shall be smooth, clean and free from hardened concrete. The casing shall be removed while the concrete is being placed. In a dewatered hole the concrete in the casing shall be maintained at a level at least 5 feet above the bottom of the casing or at a level above the bottom of the casing adequate to prevent displacement of the concrete by material from outside the casing, whichever is greater. Casing may be vibrated or hammered when required to assist in removal of the casing from the hole, to prevent lifting of the reinforcement, and to prevent concrete contamination. The withdrawal of casings shall not leave voids or cause contamination of the concrete with soil or other materials.

Portions of the holes may be enlarged, backfilled with slurry cement backfill, concrete, or other material, and redrilled to the specified diameter to control caving. Backfill material at enlarged piles shall be chemically compatible with concrete and steel, shall be drillable, and shall have the necessary strength required for the conditions.

Drill cuttings shall be disposed of in accordance with the provisions in Section 19-2.06, "Surplus Materials," of the Standard Specifications. Material resulting from placing concrete in piles, including slurry, shall be disposed of in accordance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," unless otherwise permitted in writing by the Engineer.

The second and third paragraphs of Section 49-4.05, "Inspection," of the Standard Specifications are amended to read:

Driven shells and dewatered drilled holes shall be clean and free of water before reinforcement and concrete are placed.

The Contractor shall have available at all times a suitable light for inspecting the entire length of the shells or dewatered holes before placing the reinforcement and concrete.

Construction

The Contractor shall submit a placing plan to the Engineer for approval prior to producing the test batch for cast-in-drilled-hole concrete piling and at least 10 working days prior to constructing piling. The plan shall include complete description, details, and supporting calculations as listed below:

A. Requirements for all cast-in-drilled-hole concrete piling:

1. Concrete mix design, certified test data, and trial batch reports.
2. Drilling or coring methods and equipment.
3. Proposed method for casing installation and removal when necessary.
4. Plan view drawing of pile showing reinforcement and inspection pipes, if required.
5. Methods for placing, positioning, and supporting bar reinforcement.
6. Methods and equipment for accurately determining the depth of concrete and actual and theoretical volume placed, including effects on volume of concrete when any casings are withdrawn.
7. Methods and equipment for verifying that the bottom of the drilled hole is clean prior to placing concrete.
8. Methods and equipment for preventing upward movement of reinforcement, including the Contractor's means of detecting and measuring upward movement during concrete placement operations.

Permanent steel casings shall be furnished and placed tight in the hole where shown on the plans. The provisions of Section 49-1.08, "Bearing Value and Penetration," of the Standard Specifications shall not apply to permanent steel casings. Permanent casings shall be watertight and of sufficient strength to withstand the loads from installation procedures, lateral concrete pressures, and earth pressures, and shall conform to the provisions of "Steel Pipe Piling" of these special provisions.

If the Engineer determines that a rejected pile does not require mitigation due to structural, geotechnical, or corrosion concerns, the Contractor may elect to 1) repair the pile per the approved mitigation plan, or 2) not repair anomalies found during acceptance testing of that pile. For such unrepaired piles, the Contractor shall pay to the State, \$400 per cubic yard for the portion of the pile affected by the anomalies. The volume, in cubic yards, of the portion of the pile affected by the anomalies, shall be calculated as the area of the cross-section of the pile affected by each anomaly, in square yards, as determined by the Engineer, multiplied by the distance, in yards, from the top of each anomaly to the specified tip of the pile. If the volume calculated for one anomaly overlaps the volume calculated for additional anomalies within the pile, the calculated volume for the overlap shall only be counted once. In no case shall the amount of the payment to the State for any such pile be less than \$400. The Department may deduct the amount from any moneys due, or that may become due the Contractor under the contract.

MEASUREMENT AND PAYMENT (PILING)

Measurement and payment for the various types and classes of piles shall conform to the provisions in Sections 49-6.01, "Measurement," and 49-6.02, "Payment," of the Standard Specifications and these special provisions.

The first paragraph in Section 49-6.02, "Payment," of the Standard Specifications is amended to read:

Timber, steel, and precast prestressed concrete piles, and cast-in-place concrete piles consisting of driven shells filled with concrete, will be paid for at the contract price per meter for furnish piling and the contract unit price for drive pile.

The third paragraph in Section 49-6.02, "Payment," of the Standard Specifications is amended to read:

The contract price paid per meter for cast-in-drilled-hole concrete piling shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in drilling holes, disposing of material resulting from drilling holes, temporarily casing holes and removing water when necessary, furnishing and placing concrete and reinforcement, and constructing reinforced concrete extensions, complete in place, to the required penetration, as shown on the plans, as specified in these specifications and in the special provisions, and as directed by the Engineer.

Full compensation for furnishing and placing additional testing reinforcement, for load test anchorages, and for cutting off test piles as specified, shall be considered as included in the contract price paid for piling of the type or class shown in the Engineer's Estimate, and no additional compensation will be allowed.

No additional compensation or extension of time will be made for additional foundation investigation, installation and testing of indicator piling, cutting off piling and restoring the foundation investigation and indicator pile sites, and review of request by the Engineer.

The sixth and seventh paragraphs in Section 49-6.02, "Payment," of the Standard Specifications are amended to read:

If precast prestressed concrete piling or steel pipe piling is manufactured or fabricated more than 300 air miles from both Sacramento and Los Angeles, additional shop inspection expenses will be sustained by the State. Whereas it is and will be impractical and extremely difficult to ascertain and determine the actual increase in such expenses, it is agreed that payment to the Contractor for furnishing piling of the types shown in the Engineer's Estimate will be reduced \$5000 for each manufacture or fabrication site located more than 300 air line miles from both Sacramento and Los Angeles and an additional \$3000 (\$8000 total) for each manufacture or fabrication site located more than 3000 air line miles from both Sacramento and Los Angeles.

The contract unit price paid for drive pile shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in driving timber, concrete, and steel piles, driving steel shells for cast-in-place concrete piles, placing filling materials for cast-in-place concrete piles, and cutting off piles, all complete in place to the required bearing and penetration as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

The eighth paragraph in Section 49-6.02, "Payment," of the Standard Specifications is amended to read:

Load test piles and adjacent anchor piles that become a part of the completed structure, or are shown on the plans, or are specified, will be paid for at the contract prices for the type or class of piling shown in the Engineer's Estimate.

The ninth paragraph in Section 49-6.02, "Payment," of the Standard Specifications is amended to read:

Full compensation for all jetting, drilling, providing special driving tips or heavier sections for steel piles or shells, or other work necessary to obtain the specified penetration and bearing value of the piles, for predrilling holes through embankment and filling the space remaining around the pile with sand or pea gravel, for disposing of material resulting from jetting, drilling or predrilling holes, and for all excavation and backfill involved in constructing concrete extensions as shown on the plans, and as specified in these specifications and the special provisions, and as directed by the Engineer shall be considered as included in the contract unit price paid for drive pile or in the contract price paid per meter for cast-in-drilled-hole concrete piling, and no additional compensation will be allowed therefor.

Full compensation for furnishing and placing additional testing reinforcement, load test anchorages, and for cutting off test piles as specified shall be considered as included in the contract price paid for piling of the type or class shown in the Engineer's Estimate, and no additional compensation will be allowed therefor.

No extension of time will be made for additional foundation investigation, installation and testing of indicator piling, cutting off piling and restoring the foundation investigation and indicator pile sites, or review of request by the Engineer.

Full compensation for conforming to the provisions in "Steel Pipe Piling" of these special provisions shall be considered as included in the contract prices paid for the various items of work involved, and no additional compensation will be allowed therefor.

10-1.42 PRESTRESSING CONCRETE

Prestressing concrete shall conform to the provisions in Section 50, "Prestressing Concrete," of the Standard Specifications and these special provisions.

The first paragraph in Section 50-1.02, "Drawings," of the Standard Specifications is amended to read:

The Contractor shall submit to the Division of Structure Design (DSD) for approval in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," working drawings of the prestressing system proposed for use. For initial review, 6 sets of the drawings shall be submitted for railroad bridges and 4 sets shall be submitted for other structures. After review, between 6 and 12 sets, as requested by the Engineer, shall be submitted to DSD for final approval and for use during construction.

The sixth paragraph in Section 50-1.02, "Drawings," of the Standard Specifications is amended to read:

At the completion of each structure on the contract, one set of reduced prints on 20 pound (minimum) bond paper, 11 inches by 17 inches in size, of the corrected original tracings of all working drawings for each structure shall be furnished to the Engineer. Reduced prints of drawings which are common to more than one structure shall be submitted for each structure. An index prepared specifically for the drawings for each structure containing sheet numbers and titles shall be included on the first reduced print in the set for each structure. Reduced prints for each structure shall be arranged in the order of drawing numbers shown in the index.

The seventh paragraph in Section 50-1.02, "Drawings," of the Standard Specifications is amended to read:

The edge of the corrected original tracing image shall be clearly visible and visually parallel with the edges of the page. A clear, legible symbol shall be provided as near to the upper left side of each page as is feasible within the original print to show the amount of reduction and a horizontal and vertical scale shall be provided on each reduced print to facilitate enlargement to original scale.

The eighth paragraph in Section 50-1.02, "Drawings," of the Standard Specifications is amended to read:

For railroad bridges, in addition to the reduced prints of the working drawings, the Contractor shall furnish to the Engineer one set of working drawings consisting of either ink tracings on cloth, ink tracings on polyester base drafting film, silver sensitized cloth duplicate tracings, or silver sensitized polyester based reproduction films with matte surface on both sides.

Section 50-1.05, "Prestressing Steel," of the Standard Specifications is amended to read:

Prestressing steel shall be high-tensile wire conforming to the requirements in ASTM Designation: A 421, including Supplement I; high-tensile seven-wire strand conforming to the requirements in ASTM Designation: A 416; or uncoated high-strength steel bars conforming to the requirements in ASTM Designation: A 722, including all supplementary requirements. The maximum mass requirement of ASTM Designation: A 722 will not apply.

In addition to the requirements of ASTM Designation: A 722, for deformed bars, the reduction of area shall be determined from a bar from which the deformations have been removed. The bar shall be machined no more than necessary to remove the deformations over a length of 1 foot, and reduction will be based on the area of the machined portion.

In addition to the requirements specified herein, epoxy-coated seven-wire prestressing steel strand shall be filled and grit impregnated in conformance to the requirements in ASTM Designation: A 882/A 882M, including Supplement I, and the following:

- A. The coating material shall be on the Department's list of approved coating materials for epoxy-coated strand, available from the Transportation Laboratory.
- B. The film thickness of the coating after curing shall be 15 mil to 45 mil.

- C. Prior to coating the strand, the Contractor shall furnish to the Transportation Laboratory a representative 8 ounce sample from each batch of epoxy coating material to be used. Each sample shall be packaged in an airtight container identified with the manufacturer's name and batch number.
- D. Prior to use of the strand in the work, written certifications referenced in ASTM Designation: A 882/A 882M, including a representative load-elongation curve for each size and grade of strand to be used and a copy of the quality control tests performed by the manufacturer, shall be furnished to the Engineer.
- E. In addition to the requirements in Section 50-1.10, "Samples for Testing," four 5 footlong samples of coated strand of each size and reel shall be furnished to the Engineer for testing. These samples, as selected by the Engineer, shall be representative of the material to be used in the work.
- F. Epoxy-coated strand shall be cut using an abrasive saw. Cut ends shall be coated with a patching material, furnished by the manufacturer, that is compatible with the original epoxy coating material, inert in concrete, and conforming to the requirements in Annex A1, of ASTM Designation: A 882/A 882M.

All bars in any individual member shall be of the same grade, unless otherwise permitted by the Engineer.

When bars are to be extended by the use of couplers, the assembled units shall have a tensile strength of not less than the manufacturer's minimum guaranteed ultimate tensile strength of the bars. Failure of any one sample to meet this requirement will be cause for rejection of the heat of bars and lot of couplers. The location of couplers in the member shall be subject to approval by the Engineer.

Wires shall be straightened if necessary to produce equal stress in all wires or wire groups or parallel lay cables that are to be stressed simultaneously or when necessary to ensure proper positioning in the ducts.

Where wires are to be button-headed, the buttons shall be cold formed symmetrically about the axes of the wires. The buttons shall develop the minimum guaranteed ultimate tensile strength of the wire. No cold forming process shall be used that causes indentations in the wire. Buttonheads shall not contain wide open splits, more than 2 splits per head, or splits not parallel with the axis of the wire.

Prestressing steel shall be protected against physical damage and rust or other results of corrosion at all times from manufacture to grouting or encasing in concrete. Prestressing steel that has sustained physical damage at any time shall be rejected. The development of visible rust or other results of corrosion shall be cause for rejection, when ordered by the Engineer.

Epoxy-coated prestressing steel strand shall be covered with an opaque polyethylene sheeting or other suitable protective material to protect the strand from exposure to sunlight, salt spray, and weather. For stacked coils, the protective covering shall be draped around the perimeter of the stack. The covering shall be adequately secured; however, it should allow for air circulation around the strand to prevent condensation under the covering. Epoxy-coated strand shall not be stored within 1000 feet of ocean or tidal water for more than 2 months.

Prestressing steel shall be packaged in containers or shipping forms for the protection of the steel against physical damage and corrosion during shipping and storage. Except for epoxy-coated strand, a corrosion inhibitor which prevents rust or other corrosion, shall be placed in the package or form, or shall be incorporated in a corrosion inhibitor carrier type packaging material, or when permitted by the Engineer, may be applied directly to the steel. The corrosion inhibitor shall have no deleterious effect on the steel or concrete or bond strength of steel to concrete. Packaging or forms damaged from any cause shall be immediately replaced or restored to original condition.

The shipping package or form shall be clearly marked with a statement that the package contains high-strength prestressing steel, and the type of corrosion inhibitor used, including the date packaged.

Prestressing steel for post-tensioning which is installed in members prior to placing and curing of the concrete and is which not epoxy-coated, shall be continuously protected against rust or other corrosion, until grouted, by means of a corrosion inhibitor placed in the ducts or applied to the steel in the duct. The corrosion inhibitor shall conform to the provisions herein.

When steam curing is used, prestressing steel for post-tensioning shall not be installed until the steam curing is completed.

Water used for flushing ducts shall contain either quick lime (calcium oxide) or slaked lime (calcium hydroxide) in the amount of 0.1 pound per gallon. Compressed air used to blow out ducts shall be oil free.

When prestressing steel for post-tensioning is installed in the ducts after completion of concrete curing, and if stressing and grouting are completed within 10 days after the installation of the prestressing steel, rust which may form during those 10 days will not be cause for rejection of the steel. Prestressing steel installed, tensioned, and grouted in this manner, all within 10 days, will not require the use of a corrosion inhibitor in the duct following installation of the prestressing steel. Prestressing steel installed as above but not grouted within 10 days shall be subject to all the requirements in this section pertaining to corrosion protection and rejection because of rust. These provisions shall not apply to epoxy-coated prestressing steel strand.

Any time prestressing steel for pretensioning is placed in the stressing bed and is exposed to the elements for more than 36 hours prior to encasement in concrete, adequate measures shall be taken by the Contractor, as approved by the Engineer, to protect the steel from contamination or corrosion.

After final fabrication of the seven-wire prestressing steel strand, no electric welding of any form shall be performed on the prestressing steel. Whenever electric welding is performed on or near members containing prestressing steel, the welding ground shall be attached directly to the steel being welded.

Pretensioned prestressing steel shall be cut off flush with the end of the member and, for steel that is not epoxy-coated, the exposed ends of the prestressing steel and a 1 inch strip of adjoining concrete shall be cleaned and painted. Cleaning shall be by wire brushing or abrasive blast cleaning to remove all dirt and residue on the metal or concrete surfaces. Immediately after cleaning, the surfaces shall be covered with one application of unthinned zinc-rich primer (organic vehicle type) conforming to the provisions in Section 91, "Paint," except that 2 applications shall be applied to surfaces which will not be covered by concrete or mortar. Aerosol cans shall not be used. The paint shall be thoroughly mixed at the time of application and shall be worked into any voids in the prestressing tendons.

The second paragraph in Section 50-1.08, "Prestressing," of the Standard Specifications is amended to read:

The maximum temporary tensile stress (jacking stress) in prestressing steel shall not exceed 75 percent of the specified minimum ultimate tensile strength of the prestressing steel. Pretensioned prestressing steel shall be anchored at stresses that will result in the ultimate retention of working forces at not less than those shown on the plans, but in no case shall the stress at anchorages after seating exceed 70 percent for normal relaxation strand, or 75 percent for low relaxation strand, of the specified minimum ultimate tensile strength of the prestressing steel.

The seventh paragraph in Section 50-1.08, "Prestressing," of the Standard Specifications is amended to read:

Each jack used to stress tendons shall be equipped with either: (1) two pressure gages or (2) one pressure gage and a load cell, at the option of the Contractor. The jack body shall be permanently marked with the ram area. Each pressure gage shall be fully functional and have an accurately reading dial at least 6 inches in diameter. The jack and each gage shall be calibrated as a unit with the cylinder extension in the approximate position that it will be at final jacking force. The load cell, if used, shall be calibrated and shall be provided with an indicator which may be used to determine the prestressing force in the tendon. The range of the load cell shall be such that the lower 10 percent of the manufacturer's rated capacity will not be used in determining the jacking stress. The jacking equipment calibration procedure shall be as follows:

Each jack used to stress tendons, which are permanently anchored at 25 percent or more of the specified minimum ultimate tensile strength of the prestressing steel, shall be calibrated by the Transportation Laboratory within one year prior to use and after each repair, unless otherwise directed. The Contractor shall be responsible for:

- 1) scheduling of calibration of the jacking equipment with the Transportation Laboratory;
- 2) verifying that the jack and supporting systems are complete, with proper components, and are in good operating condition;
- 3) mechanically calibrating the gages with a dead weight tester or other approved means prior to calibration of the jacking equipment by the Transportation Laboratory,
- 4) providing sufficient labor, equipment, and material to install and support the jacking and calibration equipment and to remove the equipment after the calibration is complete, and;
- 5) plotting the calibration results.

Each jack used to stress tendons, which are permanently anchored at less than 25 percent of the specified minimum ultimate tensile strength of the prestressing steel, shall be calibrated by a private laboratory approved by the Transportation Laboratory within 6 months prior to use and after each repair, unless otherwise directed.

The thirteenth paragraph in Section 50-1.08, "Prestressing," of the Standard Specifications is amended to read:

Prestressing steel in pretensioned members shall not be cut or released until the concrete in the member has attained a compressive strength of not less than the value shown on the plans or 4000 psi, whichever is greater. In addition to these concrete strength requirements, when epoxy-coated prestressing steel strand is used, the steel shall not be cut or released until the temperature of the concrete surrounding the strand is a maximum of 150° F, and this temperature is falling.

The fifth paragraph in Section 50-1.10, "Samples for Testing," of the Standard Specifications is amended to read:

The following samples of materials and tendons, selected by the Engineer from the prestressing steel at the plant or jobsite, shall be furnished by the Contractor to the Engineer well in advance of anticipated use:

- A. For wire or bars, one 7 foot long sample and for strand, one 5 foot long sample, of each size shall be furnished for each heat or reel.
- B. For epoxy-coated strand, one 5 foot long sample of uncoated strand of each size shall be furnished for each reel.
- C. If the prestressing tendon is a bar, one 7 foot long sample shall be furnished and in addition, if couplers are to be used with the bar, two 4 foot long samples of bar equipped with one coupler and fabricated to fit the coupler shall be furnished.

The second paragraph in Section 50-1.11, "Payment," of the Standard Specifications is amended to read:

The contract lump sum price paid for prestressing cast-in-place concrete of the types listed in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing, placing, and tensioning the prestressing steel, in cast-in-place concrete structures, complete in place, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

The fourth paragraph in Section 50-1.11, "Payment," of the Standard Specifications is amended to read:

Full compensation for furnishing and placing additional concrete and deformed bar reinforcing steel required by the particular system used, ducts, anchoring devices, distribution plates or assemblies and incidental parts, for furnishing samples for testing, for calibration of jacking equipment done by a private laboratory, and for pressure grouting ducts shall be considered as included in the contract lump sum price paid for prestressing cast-in-place concrete or in the contract price for furnish precast members, and no additional compensation will be allowed therefor.

The details shown on the plans for cast-in-place prestressed box girder bridges are based on a bonded full length draped tendon prestressing system. For these bridges the Contractor may, in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications, propose an alternative prestressing system utilizing bonded partial length tendons provided the proposed system and associated details meet the following requirements:

The proposed system and details shall provide moment and shear resistances at least equal to those used for the design of the structure shown on the plans.

The concrete strength shall not be less than that shown on the plans.

Not less than 35 percent of the total prestressing force at any section shall be provided by full length draped tendons.

Anchorage blocks for partial length tendons shall be located so that they will not interfere with the placement of any utility facilities shown on the plans or of any future utilities to be placed through openings shown on the plans.

Temporary prestressing tendons, if used, shall be detensioned, and the temporary ducts shall be filled with grout before completion of the work. Temporary tendons shall be either removed or fully encased in grout before completion of the work.

All details of the proposed system, including supporting checked calculations, shall be included in the drawings submitted in conformance with the provisions in Section 50-1.02, "Drawings," of the Standard Specifications.

Moments and shears for loads used in the design shown on the plans will be made available to the Contractor upon written request to the Engineer.

10-1.43 CONCRETE STRUCTURES

Portland cement concrete structures shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Delete the sixteenth paragraph of Section 51-1.05, "Forms," of the Standard Specifications.

All forms shall be removed except as provided herein. Soffit forms for deck slabs of cast-in-place box girders, forms for the interior voids of precast members, and the forms in hollow abutments or piers may remain in place when no permanent access is available into the cells or voids, or when the only utilities to be installed in completed cells or voids are to be inserted into casings which are placed prior to the completion of the cell or void. When permanent access is available into the cells or voids, or when utility facilities other than those in preplaced casings are to be installed in cells or voids, forms used to support the deck of cast-in-place box girders or to form the void of a precast member shall be removed, except that,

when the dimensions of the structure or member permit, the forms may remain in place providing the following conditions are met:

1. Any portion of the forms which obstruct access openings or conflict with utility facilities are removed.
2. A longitudinal crawl space not less than 3'-0" high and 2'-0" wide is provided throughout the length of all such cells or voids.
3. The forming system employed leaves no sharp projections into the cells or voids.
4. All forms shall be removed between the hinge and 5'-0" past the access openings in cells of cast-in-place box girder bridges that have access openings near hinges.

Add following the first paragraph of Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications.

The falsework drawings shall include details of the falsework removal operations showing the methods and sequences of removal and equipment to be used.

Delete the seventeenth paragraph of Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications.

Temporary bracing shall be provided, as necessary, to withstand all imposed loads during erection, construction and removal of any falsework. The falsework drawings shall show provisions for the temporary bracing or methods to be used to conform to this requirement during each phase of erection and removal. Wind loads shall be included in the design of the bracing or methods.

Delete the fifth and sixth paragraphs of Section 51-1.06A(1), "Design Loads," of the Standard Specifications.

The minimum horizontal load to be allowed for wind on heavy-duty steel shoring or steel pipe column falsework having a vertical load carrying capacity exceeding 30 kips per leg or column shall be the sum of the products of the wind impact area, shape factor, and applicable wind pressure value for each height zone. The wind impact area is the total projected area of all the elements in the tower face or falsework bent normal to the direction of the applied wind. The shape factor shall be taken as 2.2 for heavy-duty shoring and 1.0 for pipe column falsework. Wind pressure values shall be determined from the following table:

Height Zone (Feet above ground)	Wind Pressure Value	
	Shores or Columns Adjacent to Traffic	At Other Locations
0 to 30	20 psf	15 psf
30 to 50	25 psf	20 psf
50 to 100	30 psf	25 psf
Over 100	35 psf	30 psf

The minimum horizontal load to be allowed for wind on all other types of falsework, including falsework supported on heavy-duty shoring or pipe column falsework, shall be the sum of the products of the wind impact area and applicable wind pressure value for each zone. The wind impact area is the gross projected area of the falsework and any unrestrained portion of the permanent structure, excluding the areas between falsework bents or towers where diagonal bracing is not used. Wind pressure values shall be determined from the following table:

Height Zone (Feet above ground)	Wind Pressure Value	
	For Members Over and Bents Adjacent to Traffic Openings	At Other Locations
0 to 30	2.0 Q psf	1.5 Q psf
30 to 50	2.5 Q psf	2.0 Q psf
50 to 100	3.0 Q psf	2.5 Q psf
Over 100	3.5 Q psf	3.0 Q psf

Delete the third paragraph of Section 51-1.06A(2), "Design Stresses, Loadings, and Deflections," of the Standard Specifications.

Timber connections shall be designed in conformance with the procedures, stresses and loads permitted in the Falsework Manual as published by the Department of Transportation.

Delete the first paragraph of Section 51-1.06C, "Removing Falsework," of the Standard Specifications.

Falsework supporting any span of a simple span bridge shall not be released before 10 days after the last concrete, excluding concrete above the bridge deck, has been placed. Unless otherwise permitted by the Engineer, falsework supporting any span of a continuous or rigid frame bridge shall not be released before 10 days after the last concrete, excluding concrete above the bridge deck, has been placed in that span and in the adjacent portions of each adjoining span for a length equal to at least one-half the length of the span where falsework is to be released.

Unless otherwise specified, removing falsework supporting any span of structural members subject to bending, shall conform to the requirements for removing falsework supporting any span of a simple span bridge.

Delete Section 51-1.07, "Reinforcement," of the Standard Specifications.

Reinforcement shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

Delete the second, third and fourth paragraphs of Section 51-1.06F, "Sealed Joints," of the Standard Specifications.

Type A and AL joint seals shall consist of a groove in the concrete which is filled with field mixed and placed polyurethane or silicone sealant.

Type B joint seals shall consist of a groove in the concrete which is filled with a preformed elastomeric joint seal.

Joint seal assemblies shall consist of metal or metal and elastomeric assemblies which are anchored or cast into a recess in the concrete over the joint.

The type of seal to be used for the Movement Rating (MR) shown on the plans shall be as follows:

Movement Rating	Seal Type
0.59-inch	Type A or Type B
1.18-inch	Type A (silicone only) or Type B
>1.18-inch and <1.97-inch	Type B
>1.97-inch	joint seal assembly

Delete the first, second and fifth paragraphs of Section 51-1.06F, "Sealed Joints," of the Standard Specifications.

The sealant shall consist of a 2 component polyurethane sealant, which will withstand up to ± 25 percent movement, or a 2 component silicone sealant, which will withstand up to ± 50 percent movement.

Polyurethane and silicone sealants shall be tested in conformance with the requirements in California Test 435. The sealants shall conform to State Specification 8030-61J-01 and the following requirements:

Specification	Requirement
Modulus at 150 percent elongation	5-75 psi
Width of sealant after 7 days extension and one hour recovery	21/32-inch, max.
Condition 24 hours after notching	Notched or loss of bond 1/4-inch, max.
Condition of water immersed specimen at 7 days	Notched or loss of bond 1/4-inch, max.
Condition of specimen when tested in conformance with the requirements in ASTM Designation: G 52 using FS 40 UV-B bulbs for a minimum of 25 cycles. The cycle shall be 4 hours UV exposure at 140° F and 4 hours condensate exposure at 104° F	No more than slight checking or cracking
Grease cone penetration	0.177-0.472 inch

State Specifications for polyurethane and silicone sealants may be obtained from the Transportation Laboratory.

Polyethylene foam or rod stock shall be commercial quality, with a continuous impervious, glazed surface, suitable for retaining the liquid sealant. Contaminated primer shall be removed and replaced.

A Certificate of Compliance, accompanied by a certified test report, shall be furnished for each batch of polyurethane and silicone sealant in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

Samples of the 2 components, not less than one quart each, from each batch of sealant shall be submitted to the Transportation Laboratory. In addition, samples of manufacturer required primers, not less than one quart each, shall be submitted. The samples shall be furnished for testing, with the Certificate of Compliance, 30 days in advance of proposed use.

Delete the second paragraph of Section 51-1.12F(3)(b), "Type B Seal," of the Standard Specifications.

The preformed elastomeric joint seal shall conform to the requirements in ASTM Designation: D 2628 and the following:

The seal shall consist of a multi-channel nonporous, homogeneous material furnished in a finished extruded form.

The minimum depth of the seal, measured at the contact surface, shall be at least 95 percent of the minimum uncompressed width of the seal as designated by the manufacturer.

When tested in conformance with the requirements in California Test 673 for Type B seals, joint seals shall provide a Movement Rating (MR) of not less than that shown on the plans.

The top and bottom edges of the joint seal shall maintain continuous contact with the sides of the groove over the entire range of joint movement.

The seal shall be furnished full length for each joint with no more than one shop splice in any 59-foot length of seal.

One field splice per joint may be made at locations and by methods approved by the Engineer. The seals are to be manufactured full length for the intended joint, then cut at the approved splice section and rematched before splicing. The Contractor shall submit splicing details, prepared by the joint seal manufacturer, to the Engineer for approval prior to beginning splicing work.

The Contractor shall demonstrate the adequacy of the procedures to be used in the work before installing seals in the joints.

Shop splices and field splices shall have no visible offset of exterior surfaces, and shall show no evidence of bond failure.

At all open ends of the seal that would admit water or debris, each cell shall be filled to a depth of 3 inches with commercial quality open cell polyurethane foam, or closed by other means subject to approval by the Engineer.

Delete the second paragraph of Section 51-1.12H, "Elastomeric Bearing Pads," of the Standard Specifications.

Pads 1/2-inch or less in thickness shall conform to the provisions in Section 51-1.12H(1), "Plain and Fabric Reinforced Elastomeric Bearing Pads," of the Standard Specifications and these special provisions. At the Contractor's option, pads over 1/2-inch in thickness shall conform to the provisions in Section 51-1.12 H(2), "Steel Reinforced Elastomeric Bearings," of the Standard Specifications and these special provisions.

Delete the fifth, seventh, ninth and tenth paragraphs of Section 51-1.12H(1), "Plain and Fabric Reinforced Elastomeric Bearing Pads," of the Standard Specifications.

The peel strength test will be performed after immersing the sample in water for a minimum of 10 days. The bond between elastomer and fabric shall be such that when a sample is tested for separation, the bond shall have a minimum peel strength of 0.360 kip/ft when tested in conformance with the requirements in California Test 663.

The sole polymer in the elastomeric compound shall be neoprene and shall be not less than 60 percent by volume of the total compound. The elastomer shall be Type CR, Grade 3, and shall have a shear modulus of 109 psi \pm 11 psi, in conformance with the requirements in ASTM Designation: D 4014.

A fabric sample not less than 36 inches by 45 inches will be taken by the Engineer for testing from each new lot of fabric used in manufacturing bearing pads. A sample pad not less than 8 inches by 12 inches in size will be taken by the Engineer for testing from each lot of pads or batch of elastomer to be furnished, whichever results in the greater number of samples. The samples will be selected at random at the point of manufacture or, at the option of the Contractor, at the jobsite. Samples taken at the jobsite shall consist of complete pads as detailed on the plans, and the Contractor shall furnish additional complete pads to replace those taken for testing. Pads shall be available for sampling at least 4 weeks in advance of intended use. All sample pads for testing shall be furnished by the Contractor at the Contractor's expense.

Specimens tested in conformance with the requirements in California Test 663 shall meet the requirements for the bond between elastomer and fabric reinforcement laminations.

Delete Section 51-1.12H(2), "Steel Reinforced Elastomeric Bearings," of the Standard Specifications.

Steel reinforced elastomeric bearings shall conform to the requirements for steel-laminated elastomeric bearings in ASTM Designation: D 4014 and the following:

The bearings shall consist of alternating steel laminates and internal elastomer laminates with top and bottom elastomer covers. Steel laminates shall have a nominal thickness of 0.075-inch (14-gage). Internal elastomer laminates shall have a thickness of 1/2-inch, and the top and bottom elastomer covers shall each have a thickness of 1/4-inch. The combined thickness of internal elastomer laminates and top and bottom elastomer covers shall be equal to the bearing pad thickness shown on the plans. The total out to out thickness of a pad shall not be less than the thickness shown on the plans nor more than 1/4-inch greater than that thickness. The elastomer cover to the steel laminates at the sides of the bearing shall be 1/8-inch. If guide pins or other devices are used to control the side cover over the steel laminates, any exposed portions of the steel laminates shall be sealed by vulcanized patching. The length, width, or diameter of the bearings shall be as shown on the plans.

The total thickness of the bearings shall be equal to the thickness of elastomer laminates and covers plus the thickness of the steel laminates.

The shear modulus of the elastomer shall be 109 psi \pm 11 psi. The elastomer shall be Type CR, Grade 3. The ozone test concentration (partial pressure) shall be 14504 psi, formerly referred to as 100 parts per hundred million.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, shall be furnished to the Engineer certifying that the bearings to be furnished conform to all of the above provisions. The Certificate of Compliance shall be supported by a certified copy of the results of tests performed by the manufacturer of the bearings. One sample bearing shall be furnished to the Engineer from each lot of bearings to be furnished for the contract. Samples shall be available at least 3 weeks in advance of intended use. The sample bearing shall be one of the following:

Bearing Pad Thickness as Shown on the Plans	Sample Bearing
2-inches	Smallest complete bearing shown on the plans
> 2-inches	*2 1/4-inches \pm 1/8-inch thick sample not less than 8-inches X 12-inches in plan and cut by the manufacturer from the center of one of the thickest complete bearings

*The sample bearing plus remnant parts of the complete bearing shall be furnished to the Engineer.

A test specimen taken from the sample furnished to the Engineer will be tested in conformance with the requirements in California Test 663. Specimens tested shall show no indication of loss of bond between the elastomer and steel laminates.

Delete the third paragraph of Section 51-1.15, "Drains in Walls," of the Standard Specifications.

In addition to the drain holes and weep holes specified in the second paragraph of Section 51-1.15, "Drains in Walls," of the Standard Specifications, holes approximately 3 inches in diameter for relief of hydrostatic pressure shall be provided at the bottom of walls, immediately above the footing, at approximately 15-foot centers.

Delete the second paragraph of Section 51-1.22, "Measurement," of the Standards Specifications.

The estimated quantity of concrete for minor structures designated as final pay in the Engineer's Estimate will not be revised as specified in Section 9-1.015, "Final Pay Items," of the Standard Specifications, when the constructed height of the minor structure, including revisions by the Engineer, is within 0.5-foot of the vertical dimension shown on the plans.

Shotcrete shall not be used as an alternative construction method for reinforced concrete members unless otherwise specified.

The first sentence of the tenth paragraph in Section 51-1.05, "Forms," of the Standard Specifications is amended to read:

Form panels for exposed surfaces shall be plywood conforming to or exceeding the requirements of U.S. Product Standard PS 1 for Exterior B-B (Concrete Form) Class I Plywood or any material which will produce a smooth uniform concrete surface substantially equal to that which would result from the use of that plywood.

The second paragraph in Section 51-1.22, "Measurement," of the Standards Specifications is amended to read:

The estimated quantity of concrete for minor structures designated as final pay in the Engineer's Estimate will not be revised as specified in Section 9-1.015, "Final Pay Items," of the Standard Specifications, when the constructed height of said minor structure, including revisions by the Engineer, is within 0.5-foot of the vertical dimension shown on the plans.

The thirteenth paragraph in Section 51-1.23, "Payment," of the Standards Specifications is amended to read:

Full compensation for waterstops and strip waterstops shall be considered as included in the contract price paid per cubic yard for the various items of concrete work involved and no separate payment will be made therefor.

When a roughened concrete surface is shown on the plans, the existing concrete surface shall be roughened to a full amplitude of approximately 1/4-inch by abrasive blasting, water blasting or mechanical equipment.

Neoprene strip shall be furnished and installed at locations shown on the plans in conformance with the details shown on the plans, the provisions in the Standard Specifications, and these special provisions.

Furnishing and installing neoprene strip shall conform to the requirements for strip waterstops as provided in Section 51-1.145, "Strip Waterstops," of the Standard Specifications, except that the protective board will not be required.

All forms shall be removed between the hinge and 5 feet past the access openings in cells of cast-in-place box girder bridges that have access openings near hinges.

Materials for access opening covers in soffits of new cast-in-place concrete box girder bridges shall conform to the provisions for materials in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

Plastic pipe located at vertical drains used behind retaining walls and bridge abutments, including horizontal or sloping drains, down slopes, and across sidewalk areas shall be polyvinyl chloride (PVC) plastic pipe, Schedule 80, conforming to the provisions for pipe for edge drains and edge drain outlets in Section 68-3.02, "Materials," of the Standard Specifications. The vertical drain pipe shall be rigidly supported in place during backfilling operations.

FALSEWORK.--Falsework shall be designed and constructed in conformance with the requirements in Section 51-1.06, "Falsework," of the Standard Specifications and these special provisions.

Attention is directed to "Railroad Relations and Insurance" of these special provisions for additional requirements for falsework over railroads.

Temporary crash cushion modules, as shown on the plans and conforming to the provisions in "Temporary Crash Cushion Module," elsewhere in these special provisions, shall be installed at the approach end of temporary railings which are located less than 15 feet from the edge of a traffic lane. For two-way traffic openings, temporary crash cushion modules shall be installed at the departing end of temporary railings which are located less than 6 feet from edge of a traffic lane.

Section 51-1.06A "Falsework Design and Drawings" of the Standard Specifications is amended to read:

51-1.06A Falsework Design and Drawings.--The Contractor shall submit to the Engineer working drawings and design calculations for falsework proposed for use at bridges. For bridges where the height of any portion of the falsework, as measured from the ground line to the soffit of the superstructure, exceeds 14 feet; or where any individual falsework clear span length exceeds 16 feet; or where provision for vehicular, pedestrian, or railroad traffic through the falsework is made; the drawings shall be signed by an engineer who is registered as a Civil Engineer in the State of California. Six sets of the working drawings and 2 copies of the design calculations shall be furnished. Additional working drawings and design calculations shall be submitted to the Engineer when specified in "Railroad Relations and Insurance" of the special provisions.

The falsework drawings shall include details of the falsework erection and removal operations showing the methods and sequences of erection and removal and the equipment to be used. The details of the falsework erection and removal operations shall demonstrate the stability of all or any portions of the falsework during all stages of the erection and removal operations.

Attention is directed to Section 5-1.02, "Plans and Working Drawings."

For falsework over railroads, approval by the Engineer of the falsework drawings will be contingent upon the drawings being satisfactory to the railroad company involved.

Except for placement of foundation pads and piles, the construction of any unit of falsework shall not start until the Engineer has reviewed and approved the drawings for that unit.

Except as otherwise provided in the special provisions, the Contractor shall allow 3 weeks after complete drawings and all support data are submitted, for the review of any falsework plan.

In the event that several falsework plans are submitted simultaneously, or an additional plan is submitted for review before the review of a previously submitted plan has been completed, the Contractor shall designate the sequence in which the plans are to be reviewed. In such event, the time to be provided for the review of any plan in the sequence shall be not less than the review time specified above for that plan, plus 2 weeks for each plan of higher priority which is still under review. A falsework plan submittal shall consist of plans for a single bridge or portion thereof. For multi-frame bridges, each frame shall require a separate falsework plan submittal.

Should the Engineer fail to complete the review within the time allowance, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in falsework plan review, the delay will be considered a right of way delay as specified in Section 8-1.09, "Right of Way Delays."

The Contractor may revise approved falsework drawings provided sufficient time is allowed for the Engineer's review and approval before construction is started on the revised portions. The additional time will not be more than that which was originally allowed

If structural composite lumber is proposed for use, the falsework drawings shall clearly identify the structural composite lumber members by grade (E value), species, and type. The Contractor shall provide technical data from the manufacturer showing the tabulated working stress values of the composite lumber. The Contractor shall furnish a certificate of compliance as specified in Section 6-1.07, "Certificates of Compliance," for each delivery of structural composite lumber to the project site.

The falsework drawings shall include a superstructure placing diagram showing the concrete placing sequence and construction joint locations. When a schedule for placing concrete is shown on the contract plans, no deviation will be permitted.

The maximum length of falsework spans used to support T-beam girder bridges shall not exceed 14 feet plus 8.5 times the depth of the T-beam girder.

When footing type foundations are to be used, the Contractor shall determine the bearing value of the soil and shall show the values assumed in the design of the falsework on the falsework drawings.

When pile type foundations are to be used, the falsework drawings shall show the maximum horizontal distance that the top of a falsework pile may be pulled in order to position the falsework pile under its cap. The falsework plans shall also show the maximum allowed deviation of the top of the pile, in its final position, from a vertical line through the point of fixity of the pile.

For falsework piles with a calculated loading capacity greater than 200 kips, the falsework piles shall be designed by an engineer who is registered as either a Civil Engineer or a Geotechnical Engineer in the State of California, and the calculations shall be submitted to the Engineer.

Anticipated total settlements of falsework and forms shall be shown on the falsework drawings. These should include falsework footing settlement and joint take-up. Anticipated settlements shall not exceed 1 inch. Falsework supporting deck slabs and overhangs on girder bridges shall be designed so that there will be no differential settlement between the girders and the deck forms during placement of deck concrete.

Falsework footings shall be designed to carry the load imposed upon the footings without exceeding the estimated soil bearing values and anticipated settlements.

Foundations for individual steel towers where the maximum leg load exceeds 30 kips shall be designed and constructed to provide uniform settlement under all legs of each tower under all loading conditions.

The support systems for form panels supporting concrete deck slabs and overhangs on girder bridges shall also be considered to be falsework and designed as such.

Temporary bracing shall be provided, as necessary, to withstand all imposed loads during erection, construction, and removal of any falsework. The falsework drawings shall show provisions for the temporary bracing, or methods to be used to conform to this requirement during each phase of erection and removal. Wind loads shall be included in the design of the bracing or methods

The falsework design calculations shall show the stresses and deflections in load supporting members.

The design of falsework will not be approved unless it is based on the use of loads and conditions which are no less severe than those described in Section 51-1.06A(1), "Design Loads," and based on the use of stresses and deflections which are no greater than those described in Section 51-1.06A(2), "Design Stresses, Loadings, and Deflections." The Contractor is responsible for the proper evaluation of the falsework materials and design of the falsework to safely carry the actual loads imposed.

Section 51-1.06A(1) "Design Loads" of the Standard Specifications is amended to read:

51-1.06A(1) Design Loads.-- The design load for falsework shall consist of the sum of dead and live vertical loads, and an assumed horizontal load. The minimum total design load for any falsework, including members that support walkways, shall be not less than 100 pounds per square foot for the combined live and dead load regardless of slab thickness.

Dead loads shall include the loads due to the mass of concrete, reinforcing steel, forms, and falsework. The loads due to the mass of concrete, reinforcing steel, and forms shall be assumed to be not less than 160 pounds per cubic foot for normal concrete and not less than 130 pounds per cubic foot for lightweight concrete.

Live loads shall consist of the actual load of any equipment to be supported by falsework applied as concentrated loads at the points of contact, and a uniform load of not less than 20 pounds per square foot applied over the area supported, plus 75 pounds per linear foot applied at the outside edge of deck overhangs.

The assumed horizontal load to be resisted by the falsework bracing system shall be the sum of the actual horizontal loads due to equipment, construction sequence, or other causes, and an allowance for wind, but in no case shall the assumed horizontal load to be resisted in any direction be less than 2 percent of the total dead load. The falsework shall be designed so that it will have sufficient rigidity to resist the assumed horizontal load without considering the load due to the concrete

The minimum horizontal load to be allowed for wind on heavy-duty steel shoring or steel pipe column falsework having a vertical load carrying capacity exceeding 30 kips per leg or column shall be the sum of the products of the wind impact area, shape factor, and applicable wind pressure value for each height zone. The wind impact area is the total projected area of all the elements in the tower face or falsework bent normal to the direction of the applied wind. The shape factor shall be taken as 2.2 for heavy-duty shoring and 1.0 for pipe column falsework. Wind pressure values shall be determined from the following table:

Height Zone (Feet above ground)	Wind Pressure Value (psf)	
	Shores or Columns Adjacent to Traffic	At Other Locations
0-30	20	15
30-50	25	20
50-100	30	25
over 100	35	30

The minimum horizontal load to be allowed for wind on all other types of falsework, including falsework supported on heavy-duty shoring or pipe column falsework, shall be the sum of the products of the wind impact area and applicable wind pressure value for each height zone. The wind impact area is the gross projected area of the falsework and any unrestrained portion of the permanent structure, excluding the areas between falsework bents or towers where diagonal bracing is not used. Wind pressure values shall be determined from the following table:

Height Zone (Feet above ground)	Wind Pressure Value (psf)	
	For Members Over and Bents Adjacent to Traffic Opening	At Other Locations
0-30	2.0 Q	1.5 Q
30-50	2.5 Q	2.0 Q
50-100	3.0 Q	2.5 Q
over 100	3.5 Q	3.0 Q

$Q = 1 + 0.2W$; but shall not be more than 10.

W = width of the falsework system, in feet, measured in the direction of the wind force being considered.

The entire superstructure cross-section, except railing, shall be considered to be placed at one time except as provided herein. Girder stems and connected bottom slabs, if placed more than 5 days prior to the top slab, may be considered to be self supporting between falsework posts at the time the top slab is placed provided that the distance between falsework posts does not exceed 4 times the depth of the portion of the girder placed in the first pour.

In addition to the minimum requirements specified in this Section 51-1.06A, falsework for box girder structures with internal falsework bracing systems using flexible members capable of withstanding tensile forces only, shall be designed to include the vertical effects caused by the elongation of the flexible member and the design horizontal load combined with the dead and live loads imposed by concrete placement for the girder stems and connected bottom slabs. Falsework comprised of individual steel towers with bracing systems using flexible members capable of withstanding tensile forces only to resist overturning, shall be exempt from these additional requirements.

If the concrete is to be prestressed, the falsework shall be designed to support any increased or readjusted loads caused by the prestressing forces.

Section 51-1.06A(2), "Design Stresses, Loadings, and Deflections," of the Standard Specifications is amended to read:

51-1.06A(2) Falsework Design and Drawings.-- The maximum allowable design stresses and loadings listed in this Section 51-1.06A(2), are based on the use of undamaged, high-quality materials, and such stresses and loadings shall be reduced by the Contractor if lesser quality materials are to be used.

The maximum allowable stresses, loadings, and deflections used in the design of the falsework shall be as follows:

Timber:

Compression perpendicular to the grain	450 psi
Compression parallel to the grain	$480000 \div (L/d)^2$ psi; not to exceed 1600 psi
Flexural stress	1800 psi; 1500 psi for members with a nominal depth of 8 inches or less
Horizontal shear	140 psi
Axial tension	1200 psi
Deflection due to concrete loading only	0.0042 of the span, irrespective of deflection compensated for by camber strips
Modulus of elasticity (E)	1.6×10^6 psi
Timber piles	45 tons

L = unsupported length.

d = least dimension of a square or rectangular column, or the width of a square of equivalent cross-sectional area for round columns.

Timber connections shall be designed in conformance with the procedures, stresses, and loads permitted in the Falsework Manual as published by the Department of Transportation.

Steel:

For identified grades of steel, design stresses, except stresses due to flexural compression, shall not exceed those specified in the Manual of Steel Construction as published by the AISC.

When the grade of steel cannot be positively identified, design stresses, except stresses due to flexural compression, shall not exceed either those specified in the AISC Manual for ASTM Designation: A 36/A 36M steel or the following:

Tension, axial and flexural	22000 ksi
Compression, axial	$16000 - 0.38(L/r)^2$ psi; except L/r shall not exceed 120
Shear on gross section of web of rolled shapes	14500 psi
Web crippling for rolled shapes	27000 psi

For all grades of steel, design stresses and deflections shall not exceed the following:

Compression, flexural	$12\,000\,000 \text{ Ld/bt}$ psi, but not to exceed 22000 psi for unidentified steel or steel conforming to the requirements in ASTM Designation: A 36/A 36M nor $0.6F_y$ for other identified steel
Deflection due to concrete loading only	0.0042 of the span, irrespective of deflection compensated for by camber strips

In the foregoing formulas, L is the unsupported length; d is the least dimension of rectangular columns, or the width of a square of equivalent cross-sectional area for round columns, or the depth of beams; b is the width and t is the thickness of the compression flange; and r is the radius of gyration of the member. All dimensions are expressed in inches. F_y is the specified minimum yield stress, in pounds per square inch, for the grade of steel used.

The modulus of elasticity (E) used for steel shall be 30×10^6 psi.

Manufactured Assemblies:

The maximum loadings and deflections used on jacks, brackets, columns, joists, and other manufactured devices shall not exceed the manufacturer's recommendations except that the dead load deflection of the joists used at locations other than under deck slabs between girders shall not exceed 0.0042 of their spans. If requested by the Engineer, the Contractor shall furnish engineering data from the manufacturer verifying the manufacturer's recommendations, or shall perform tests as necessary to demonstrate the adequacy of the devices proposed for use.

Welding and Nondestructive Testing

Welding of steel members, except for when fillet welds are used where load demands are less than or equal to 1000 pounds per inch for each 1/8-inch of fillet weld, shall conform to AWS D1.1 or other recognized welding standard. The welding standard to be utilized shall be specified by the Contractor on the working drawings.

Splices made by field welding of steel beams at the project site shall undergo nondestructive testing (NDT). At the option of the Contractor, either ultrasonic testing (UT) or radiographic testing (RT) shall be used as the method of NDT for each field weld and any repair made to a previously welded splice in a steel beam. Testing shall be performed at locations selected by the Contractor. The length of a splice weld where NDT is to be performed, shall be a cumulative weld length equal to 25 percent of the original splice weld length. The cover pass shall be ground smooth at the locations to be tested. The acceptance criteria shall conform to the requirements of AWS D1.1, Section 6, for cyclically loaded nontubular connections subject to tensile stress. If repairs are required in a portion of the weld, additional NDT shall be performed on the repaired sections. The NDT method chosen shall be used for an entire splice evaluation including any required repairs.

For all field welded splices and previously welded splices, the Contractor shall furnish to the Engineer a letter of certification which certifies that all welding and NDT, including visual inspection, are in conformance with the specifications and the welding standard shown on the approved working drawings. The letter of certification shall be signed by an engineer who is registered as a Civil Engineer in the State of California and shall be provided prior to placing any concrete for which the falsework is being erected to support

Section 51-1.06A(3), "Special Locations," of the Standard Specifications is amended to read:

51-1.06A(3) Special Locations.--In addition to the minimum requirements specified in this Section 51-1.06A, falsework over or adjacent to roadways or railroads which are open to traffic shall be designed and constructed so that the falsework will be stable if subjected to impact by vehicles. Falsework posts which support members that cross over a roadway or railroad shall be considered as adjacent to roadways or railroads. Other falsework posts shall be considered as adjacent to roadways or railroads only if they are located in the row of falsework posts nearest to the roadway or railroad, and the horizontal distance from the traffic side of the falsework to the edge of pavement, or to a point 10 feet from the centerline of track, is less than the total height of the falsework and forms. The Contractor shall provide any additional features for the work needed to ensure that falsework will be stable if subjected to impact by vehicles and to comply with the provisions in Section 7-1.09, "Public Safety." The falsework design at these locations shall include, but not be limited to, the following minimum provisions:

The vertical load used for the design of falsework posts and towers, but not footings, which support the portion of the falsework over openings, shall be the greater of the following:

- 1) 150 percent of the design load calculated in conformance with the provisions for design load previously specified but not including any increased or readjusted loads caused by the prestressing forces, or
- 2) the increased or readjusted loads caused by the prestressing forces.

Falsework posts adjacent to roadways or railroads shall consist of either steel with a minimum section modulus about each axis of 9.5 inches cubed, or sound timbers with a minimum section modulus about each axis of 250 inches cubed.

Each falsework post adjacent to roadways or railroads shall be mechanically connected to its supporting footing at its base, or otherwise laterally restrained, so as to withstand a force of not less than 9 kN applied at the base of the post in any direction except toward the roadway or railroad track. The posts also shall be mechanically connected to the falsework cap or stringer. The mechanical connection shall be capable of resisting a load in any horizontal direction of not less than 1000 pounds.

For falsework spans over roadways, all exterior falsework stringers, and stringers adjacent to the ends of discontinuous caps, the stringer or stringers over points of minimum vertical clearance and every fifth remaining stringer, shall be mechanically connected to the falsework cap or framing. The mechanical connections shall be capable of resisting a load in any direction, including uplift on the stringer, of not less than 500 pounds. The connections shall be installed before traffic is allowed to pass beneath the span. For falsework spans over railroads, all falsework stringers shall be so connected to caps.

When timber members are used to brace falsework bents which are located adjacent to roadways or railroads, all connections for the timber bracing shall be of the bolted type using 5/8-inch diameter or larger bolts.

The falsework shall be located so that falsework footings or piles are at least 3 inches clear of railing posts and barriers, and all other falsework members are at least 1 foot clear of railing members and barriers.

Falsework bents within 20 feet of the center line of a railroad track shall be sheathed solid in the area between 3 feet and 17 feet above the track elevation on the side facing the track. Sheathing shall consist of plywood not less than 5/8-inch thick or lumber not less than 3/4-inch thick. Bracing on these bents shall be adequate so that the bent will resist the required assumed horizontal load or 5000 pounds, whichever is greater.

The dimensions of the clear openings to be provided through falsework for roadways shall be as specified in "Maintaining Traffic," of the special provisions

The dimensions of clear openings to be provided through the falsework for railroads shall be as specified in "Railroad Relations and Insurance," of the special provisions.

Section 51-1.06B, "Falsework Construction," of the Standard Specifications is amended to read:

51-1. 06B, Falsework Construction.--The falsework shall be constructed to substantially conform to the falsework drawings. The materials used in the falsework construction shall be of the quality necessary to sustain the stresses required by the falsework design. When manufactured assemblies are used in falsework, the Contractor shall furnish to the Engineer a letter of certification which certifies that all components of these manufactured assemblies are used in conformance with the manufacturer's recommendations. The workmanship used in falsework construction shall be of such quality that the falsework will support the loads imposed on the falsework without excessive settlement or take-up beyond that shown on the falsework drawings.

Falsework shall be founded on a solid footing safe against undermining, protected from softening, and capable of supporting the loads imposed on the falsework. When requested by the Engineer, the Contractor shall demonstrate by suitable load tests that the soil bearing values assumed for the design of the falsework do not exceed the supporting capacity of the soil.

When falsework is supported on piles, the piles shall be driven and the actual bearing value assessed in conformance with the provisions in Section 49, "Piling."

For falsework piles with a calculated loading capacity greater than 200 kips, the Contractor shall conduct dynamic monitoring of pile driving and conduct penetration and bearing analyses based on a wave equation analysis. These analyses shall be signed by an engineer who is registered as a Civil Engineer in the State of California and submitted to the Engineer prior to completion of falsework erection.

When falsework is over or adjacent to roadways or railroads, all details of the falsework system which contribute to horizontal stability and resistance to impact, except for bolts in bracing, shall be installed at the time each element of the falsework is erected and shall remain in place until the falsework is removed.

Prior to the placement of falsework members above the stringers, the final bracing system for the falsework shall be installed.

Temporary railing (Type K), conforming to the provisions in Section 12-3, "Traffic-Handling Equipment and Devices," shall be installed on both sides of all vehicular openings through falsework and, when ordered by the Engineer, at all other falsework less than 12 feet from the edge of a traffic lane. Temporary railings shall begin approximately 150 feet in advance of the falsework and shall extend past the falsework, in the direction of adjacent traffic flow. For 2-way traffic openings, the temporary railing shall extend at least 60 feet past the falsework, in the direction of adjacent traffic flow. The location and length of railing and the type of flare to be used shall be as ordered by the Engineer. The clear vehicular opening between temporary railings shall be not less than that specified in the special provisions.

The installation of temporary railing shall be complete before falsework erection is begun. Temporary railing at falsework shall not be removed until the removal is approved by the Engineer.

Temporary railing (Type K) installed as specified above will be measured and paid for as provided in Section 12-4, "Measurement and Payment," except that when the Engineer's Estimate does not include a contract item for temporary railing (Type K), full compensation for furnishing, placing, maintaining, repairing, replacing, and removing the temporary railing at falsework locations as specified in this Section 51-1.06B, shall be considered as included in the contract prices paid for the various items of work requiring falsework, and no separate payment will be made therefor.

Camber strips shall be used where directed by the Engineer to compensate for falsework deflection, vertical alignment, and anticipated structure deflection. The Engineer will furnish to the Contractor the amount of camber to be used in constructing the falsework.

The Contractor shall provide tell-tales attached to the soffit forms and readable from the ground in enough systematically placed locations to determine the total settlement of the entire portion of the structure where concrete is being placed.

Deck slab forms between girders shall be constructed with no allowance for settlement relative to the girders.

Dead loads, other than those due to forms and reinforcing steel, shall not be applied to any falsework until authorized by the Engineer.

Should unanticipated events occur, including settlements that deviate by more than $\pm 3/8$ -inch from those indicated on the falsework drawings, which in the opinion of the Engineer would prevent obtaining a structure conforming to the requirements of these specifications, the placing of concrete shall be discontinued until corrective measures satisfactory to the Engineer are provided. In the event satisfactory measures are not provided prior to initial set of the concrete in the affected area, the placing of concrete shall be discontinued at a location determined by the Engineer. All unacceptable concrete shall be removed.

Section 51-1.06C, "Removing Falsework," of the Standard Specifications is amended to read:

51-1. 06C, Removing Falsework.--Falsework supporting any span of a simple span bridge shall not be released before 10 days after the last concrete, excluding concrete above the bridge deck, has been placed. Unless otherwise permitted by the Engineer, falsework supporting any span of a continuous or rigid frame bridge shall not be released before 10 days after the last concrete, excluding concrete above the bridge deck, has been placed in that span and in the adjacent portions of each adjoining span for a length equal to at least one-half the length of the span where falsework is to be released.

Falsework for cast-in-place prestressed portions of structures shall not be released until after the prestressing steel has been tensioned

Falsework supporting any span of a continuous or rigid frame bridge shall not be removed until all required prestressing has been completed in that span and in the adjacent portions of each adjoining span for a length equal to at least one-half the length of the span where falsework is to be released.

Falsework for arch bridges shall be removed uniformly and gradually, beginning at the crown and working toward the springing, to permit the arch to take its load slowly and evenly. Falsework for adjacent arch spans shall be struck simultaneously.

Falsework supporting overhangs, deck slabs between girders, and girder stems which slope 45 degrees or more off vertical shall not be released before 7 days after the deck concrete has been placed.

Falsework supporting the sides of the girder stems which slope less than 45 degrees off vertical may be removed prior to placing deck slab concrete, providing a reshoring system is installed. The reshoring system shall consist of lateral supports which are designed to resist all rotational forces acting on the stem, including those caused by the placement of deck slab concrete. The lateral supports shall be installed immediately after each form panel is removed and prior to the release of supports for the adjacent form panel.

Falsework for bent caps which will support steel or precast concrete girders shall not be released before 7 days after the cap concrete has been placed. Girders shall not be erected onto the bent caps until the concrete in the cap has attained a compressive strength of 2600 pounds per square inch or 80 percent of the specified strength, whichever is higher

Unless otherwise specified, removing falsework supporting any span of structural members subject to bending, shall conform to the requirements for removing falsework supporting any span of a simple span bridge.

In addition to the above requirements, no falsework for bridge spans shall be released until the supported concrete has attained a compressive strength of 2600 pounds per square inch or 80 percent of the specified strength, whichever is higher.

Falsework for box culverts and other structures with decks lower than the roadway pavement and with span lengths of 14 feet or less shall not be released until the last placed concrete has attained a compressive strength of 1500 pounds per square inch, provided that curing of the concrete is not interrupted. Falsework removal for other box culverts shall conform to the requirements for release of bridge falsework.

Falsework for arch culverts shall not be released before 40 hours after the supported concrete has been placed.

The falsework removal operation shall be conducted in such a manner that any portion of the falsework not yet removed remains in a stable condition at all times.

All falsework materials shall be completely removed. Falsework piling shall be removed at least 2 feet below the surface of the original ground or original streambed. When falsework piling is driven within the limits of ditch or channel excavation areas, the falsework piling within those areas shall be removed to at least 2 feet below the bottom and side slopes of the excavated areas.

All debris and refuse resulting from the work shall be removed and the premises left in a neat and presentable condition.

In addition to the provisions in Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications, the time to be provided for the Engineer's review of the working drawings for specific structures, or portions thereof, shall be as follows:

Structure or Portion of Structure	Total Review Time - Weeks
East El Monte Overhead (Widen) Br. No. 53-0867	10
Garvey Avenue Off-Ramp Undercrossing (Widen) Br. No. 53-1032	4

COST REDUCTION INCENTIVE PROPOSALS FOR CAST-IN-PLACE PRESTRESSED BOX GIRDER BRIDGES

Except as provided herein, cast-in-place prestressed box girder bridges shall be constructed in conformance with the details shown on the plans and the provisions in Section 50, "Prestressing Concrete," and Section 51, "Concrete Structures," of the Standard Specifications.

If the Contractor submits cost reduction incentive proposals for cast-in-place prestressed box girder bridges, the proposals shall be in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications and these special provisions.

The Engineer may reject any proposal which, in the Engineer's judgment, may not produce a structure which is at least equivalent to the planned structure.

At the time the cost reduction incentive proposal (CRIP) is submitted to the Engineer, the Contractor shall also submit 4 sets of the proposed revisions to the contract plans, design calculations, and calculations from an independent checker for all changes involved in the proposal, including revisions in camber, predicted deck profile at each construction stage, and falsework requirements to the Division of Structure Design, Documents Unit, P.O. Box 942874, Sacramento, CA 94274-0001 (1801 30th Street, Sacramento, CA 95816), telephone (916) 227-8230. When notified in writing by the Engineer, the Contractor shall submit 12 sets of the CRIP plan revisions and calculations to the Division of Structure Design for final approval and use during construction. The calculations shall verify that all requirements are satisfied. The CRIP plans and calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California.

The CRIP plans shall be either 11" x 17" or 22" x 34" in size and each CRIP plan sheet and calculation sheet shall include the State assigned designations for the contract number, bridge number, full name of the structure as shown on the contract plans, and District-County-Route-Post Mile. Each CRIP plan sheet shall be numbered in the lower right hand corner and shall contain a blank space in the upper right hand corner for future contract sheet numbers.

Within 3 weeks after final approval of the CRIP plan sheets, one set of the corrected good quality prints on 20 pound (minimum) bond paper (22" x 34" in size) of all CRIP plan sheets prepared by the Contractor for each CRIP shall be furnished to the Division of Structure Design, Documents Unit.

Each CRIP shall be submitted prior to completion of 25 percent of the contract working days and sufficiently in advance of the start of the work that is proposed to be revised by the CRIP to allow time for review by the Engineer and correction by the Contractor of the CRIP plans and calculations without delaying the work. The Contractor shall allow a minimum of 10 weeks for the review of a CRIP. In the event that several CRIPs are submitted simultaneously, or an additional CRIP is submitted for review before the review of a previously submitted CRIP has been completed, the Contractor shall designate the sequence in which the CRIPs are to be reviewed. In this event, the time to be provided for the review of any proposal in the sequence shall be not less than the review time specified herein for that proposal, plus 2 weeks for each CRIP of higher priority which is still under review.

Should the review not be complete by the date specified in the Contractor's CRIP, or such other date as the Engineer and Contractor may subsequently have agreed to in writing and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in review of CRIP plans and calculations, an extension of time commensurate with the delay in completion of the work thus caused will be granted as provided in Section 8-1.07, "Liquidated Damages," of the Standard Specifications except that the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications shall not apply.

Permits and approvals required of the State have been obtained for the structures shown on the plans. Proposals which result in a deviation in configuration may require new permits or approvals. The Contractor shall be responsible for obtaining the new permits and approvals before the Engineer will reach a decision on the proposal. Delays in obtaining permits and approvals will not be reason for granting an extension of contract time.

All proposed modifications shall be designed in conformance with the bridge design specifications and procedures currently employed by the Department. The proposal shall include all related, dependent or incidental changes to the structure and other work affected by the proposal. The proposal will be considered only when all aspects of the design changes are included for the entire structure. Changes, such as but not limited to, additional reinforcement and changes in location of reinforcement, necessary to implement the CRIP after approval by the Engineer, shall be made at the Contractor's expense.

Modifications may be proposed in (1) the thickness of girder stems and deck slabs, (2) the number of girders, (3) the deck overhang dimensions as specified herein, (4) the amount and location of reinforcing steel, (5) the amount and location

of prestressing force in the superstructure, and (6) the number of hinges, except that the number of hinges shall not be increased. The strength of the concrete used may be increased but the strength employed for design or analysis shall not exceed 6,000 psi.

Modifications proposed to the minimum amount of prestressing force which must be provided by full length draped tendons are subject to the provisions in "Prestressing Concrete" of these special provisions.

No modifications will be permitted in (1) the foundation type, (2) the span lengths or (3) the exterior dimensions of columns or bridge superstructure, except that the overhang dimension from face of exterior girder to the outside edge of roadway deck may be uniformly increased or decreased by 25 percent on each side of the box girder section. Fixed connections at the tops and bottoms of columns shown on the plans shall not be eliminated.

The Contractor shall be responsible for determining construction camber and obtaining the final profile grade as shown on the plans.

The Contractor shall reimburse the State for the actual cost of investigating CRIPs for cast-in-place prestressed box girder bridges submitted by the Contractor. The Department will deduct this cost from any moneys due, or that may become due, the Contractor under the contract, regardless of whether or not the proposal is approved or rejected.

DECK CLOSURE POURS

Where a deck closure pour is shown on the plans, reinforcement protruding into the closure space and forms for the closure pour shall conform to the following:

During the time of placement of concrete in the deck, other than for the closure pour itself, reinforcing steel which protrudes into the closure space shall be completely free from any connection to the reinforcing steel, concrete, or other attachments of the adjacent structure, including forms. The reinforcing steel shall remain free of any connection for a period of not less than 24 hours following completion of the pour.

Forms for the closure pour shall be supported from the superstructure on both sides of the closure space.

SLIDING JOINTS.--Sliding joints consisting of a neoprene strip lubricated with grease and covered with sheet metal shall conform to the following requirements:

Neoprene strip shall conform to the requirements for neoprene in Section 51-1.14, "Waterstops," of the Standard Specifications.

Grease shall conform to the requirements of Military Specification: MIL-S-8660. A uniform film of grease shall be applied to the upper surface of the neoprene strip prior to placing the sheet metal.

Sheet metal shall be commercial quality galvanized sheet steel. The sheet metal shall be smooth and free of kinks, bends, or burrs. Joints in the sheet metal shall be butt joints sealed with plastic duct sealing tape.

Construction methods and procedures shall prevent grout or concrete seepage into the sliding joint assembly.

The concrete surfaces on which the neoprene strips will be placed shall be floated to a level plane and finished with a steel trowel.

SLIDING BEARINGS

Sliding bearings consisting of elastomeric bearing pads lubricated with grease and covered with sheet metal shall conform to the following requirements:

Grease shall conform to the requirements of Military Specification: MIL-S-8660. A uniform film of grease shall be applied to the upper surface of the pads prior to placing the sheet metal.

Sheet metal shall be commercial quality galvanized sheet steel. The sheet metal shall be smooth and free of kinks, bends, or burrs.

Construction methods and procedures shall prevent grout or concrete seepage into the sliding bearing assembly.

ELASTOMERIC BEARING PADS

Elastomeric bearing pads shall conform to the provisions in Section 51-1.12H, "Elastomeric Bearing Pads," of the Standard Specifications and these special provisions, except that elastomeric bearing pads for the East El Monte Overhead (Widen), Br. No. 53-0867, shall conform to the details shown on the plans and to the requirements of Chapter 8, Part 18, of the AREA Manual for Railway Engineering.

The fifth paragraph of Section 51-1.12H(1), "Plain and Fabric Reinforced Elastomeric Bearings," of the Standard Specifications is amended to read:

The peel strength test will be performed after immersing the sample in water for a minimum of 10 days. The bond between elastomer and fabric shall be such that when a sample is tested for separation, it shall have a minimum peel strength of 30 pounds per inch when tested in accordance with California Test 663.

The last 2 sentences of the tenth paragraph of Section 51-1.12H(1), "Plain and Fabric Reinforced Elastomeric Bearings," of the Standard Specifications are amended to read:

Pads shall be available for sampling at least 4 weeks in advance of intended use. All sample pads for testing shall be furnished by the Contractor at the Contractor's expense.

The fifth subparagraph of the first paragraph of Section 51-1.12H(2), "Steel Reinforced Elastomeric Bearings," of the Standard Specifications is amended to read:

One sample bearing shall be furnished to the Engineer from each lot of bearings to be furnished for the contract. Samples shall be available at least 3 weeks in advance of intended use. The sample bearing shall be one of the following:

BEARING PAD THICKNESS AS SHOWN ON THE PLANS	SAMPLE BEARING
2 inches or less.....	Smallest complete bearing shown on the plans.
Greater than 2 inches.....	* 2.25±0.125 inch thick sample not less than 8 inches by 12 inches in plan and cut by the manufacturer from the center of one of the thickest complete bearings.
* The sample bearing plus remnant parts of the complete bearing shall be furnished to the Engineer.	

SLIP FORM METHOD FOR CONSTRUCTING RETAINING WALLS

At the Contractor's option, retaining wall stems may be constructed using a fixed form on the exterior face and a slip form on the back face of the wall. Construction of retaining walls using the slip form method shall conform to these special provisions. The retaining wall stem is the portion of the retaining wall from the top of footing to the top of wall.

If the Contractor elects to use the slip form method to construct retaining wall stems, the Contractor shall submit complete construction plans to the Division of Structure Design (DSD) in conformance with the provisions for working drawings in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. For initial review, 4 sets of plans shall be submitted. After review, between 6 and 12 sets, as requested by the Engineer, shall be submitted to DSD for final approval and use during construction.

The plans shall be 11" x 17" or 22" x 34" size, and shall include the following:

- A. Methods for placing, finishing, curing, and protecting the concrete;
- B. A description of the measures to be taken that will assure the quality of the completed retaining wall;
- C. Drawings and calculation sheets, signed by an engineer who is registered as a Civil Engineer in the State of California, showing any proposed revisions to dimensions or reinforcement shown on the plans;
- D. The designation and location of the walls where the slip form method is proposed for use;
- E. The State assigned contract number, full name of the structure as shown on the contract plans, District-County-Route-Kilometer Post, and the Contractor's (and involved Subcontractor's) names on each sheet. Each sheet shall be numbered in the lower right hand corner and shall contain a blank space in the upper right hand corner for future contract sheet numbers.

Construction plans shall be submitted sufficiently in advance of the start of the affected work to allow time for review by the Engineer, and correction by the Contractor of the plans without delaying the work. Such time shall be proportional to the complexity of the work but in no case shall such time be less than 6 weeks after complete plans and all support data are submitted.

Should the Engineer fail to review the complete submittal within the time specified, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the construction plans, an extension of time only, commensurate with the delay in completion of the work thus caused, will be granted in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

A preconstruction slip form method test panel for each retaining wall height and thickness shown on the plans, shall be constructed by the crew scheduled to perform the work shown on the plans, using equipment, materials, mixing proportions, ambient temperatures, and procedures proposed for the work. The preconstruction slip form method test panel shall conform to the following:

1. The test panel shall have the same thickness, height and number of lifts, and bar reinforcement of the same size, amount, and positioning as the retaining wall stem to be placed. The test panel shall be square, with the length of the panel equal to the height.
2. The test panel shall be finished by the methods to be used on the retaining wall stem.
3. The test panel shall be cured under the same conditions as anticipated for the actual work.

The Contractor may request the Engineer to waive the requirement for constructing preconstruction slip form method test panels if a test panel report is furnished from a State highway retaining wall project with a similar application of approximately equal thickness and height, and similar amounts and placement of reinforcement. The crew members scheduled to perform the work shown on the plans shall have constructed the test panel described in the test panel report. The test panel report shall list the names of the crew members, equipment used, materials, mixing proportions, ambient temperatures, and procedures used to make the test panels. The test panel report shall include photographs of the finished retaining wall.

At the Contractor's option, the back face of a retaining wall stem constructed by the slip form method may be vertical. The thickness of the retaining wall stem with a vertical back face shall be the thickness at the base of the stem shown on the plans. The back face reinforcement for a retaining wall stem with a vertical back face shall be vertical, with the same clearance from the finished back of wall stem surface as shown on the plans.

If the Contractor chooses to construct a retaining wall stem by the slip form method, as described in these special provisions, no changes shall be made to the horizontal or vertical alignment of the retaining wall footing or stem, or to the size, length, or spacing of the back face vertical reinforcement at the bottom of the wall stem.

Each slip formed section of retaining wall stem shall have fixed, full-height bulkheads on both ends.

Concrete shall be supplied to the slip form machine at a uniform rate. The slip form shall be operated under sufficient restraint from forward motion and the concrete vibrated to produce a well compacted mass of concrete requiring no finishing other than that conforming to the provisions in Section 51-1.18B, "Class 1 Surface Finish," of the Standard Specifications.

A joint between lifts of concrete due to a delay between loads, as determined by the Engineer, will be cause for rejection of that portion of the retaining wall back to the nearest vertical expansion joint.

Full compensation for additional formwork, reinforcement, concrete, finishing, excavation, and backfill made necessary by the use of the slip form construction method shall be considered as included in the contract prices paid for the various items of work involved in retaining wall construction and no additional compensation will be allowed therefor.

MEASUREMENT AND PAYMENT

Measurement and payment for concrete in structures shall conform to the provisions in Sections 51-1.22, "Measurement," and 51-1.23, "Payment," of the Standard Specifications and these special provisions.

Full compensation for roughening existing concrete surfaces to a full amplitude of approximately 1/4-inch, where shown on the plans, shall be considered as included in the contract price paid per cubic yard for structural concrete, bridge and no separate payment will be made therefor.

The seventh paragraph of Section 51-1.22, "Measurement," of the Standard Specifications is deleted.

The thirteenth paragraph of Section 51-1.23, "Payment," of the Standard Specifications is amended to read:

Full compensation for waterstops, strip waterstops, and neoprene strip shall be considered as included in the contract price paid per cubic yard for the various items of concrete work involved and no separate payment will be made therefor.

Full compensation for furnishing and installing access opening covers in soffits of new cast-in-place box girder bridges shall be considered as included in the contract price paid per cubic yard for structural concrete, bridge and no separate payment will be made therefor.

Full compensation for furnishing and installing plastic pipe located at vertical drains used behind retaining walls and bridge abutments, including horizontal or sloping drains down slopes and across sidewalk areas, including excavation and backfill involved in placing the plastic pipe, shall be considered as included in the contract price paid per cubic yard for the various items of concrete work and no separate payment will be made therefor.

Full compensation for placing concrete in cored holes at the existing footing of San Gabriel River Bridge shall be considered as included in the contract price paid per cubic yard for structural concrete, bridge footing and no separate payment will be made therefor.

Full compensation for replacing bearing pads at the San Gabriel River Bridge shall be considered as included in the contract price paid per cubic yard for structural concrete, bridge and no separate payment will be made therefor.

Full compensation for furnishing and installing 3" ductile iron pipe for drainage at abutment walls shall be considered as included in the contract price paid per cubic yard for structural concrete, bridge and no additional compensation will be allowed therefor.

10-1.44 POLYESTER CONCRETE EXPANSION DAM

Polyester concrete expansion dams shall consist of sawing and removing portions of existing expansion dams, preparing and cleaning contact surfaces and joints, placing bar reinforcing steel and dowels, removing asphaltic concrete surfacing, applying prime coat, and placing polyester concrete at bridge joints in accordance with the details shown on the plans and the requirements of these special provisions.

The asphalt concrete overlay shall be placed and then saw cut and removed at expansion dams.

Existing expansion dams and portland cement concrete shall be removed to the dimensions shown on the plans by methods that shall not damage the portland cement concrete or asphaltic concrete which is to remain in place.

When the expansion dam repair exceeds 6 feet in length, a joint material, consisting of 1/4 inch wide expanded polyurethane or expanded polyethylene, shall be installed. The joint material shall be placed at no more than 6-foot spacing, as shown on the plans.

Reinforcing steel shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications.

Where dowels are to be bonded in holes drilled into existing concrete, the holes shall be drilled 1/4 inch larger than the specified dowel diameter by methods that will not shatter or damage the concrete adjacent to the hole.

The drilled holes shall be clean and dry at the time of placing the bonding material and the steel dowels. The bonding material and the steel dowel shall completely fill the drilled hole. The bonding material shall be the same resin used for the prime coat.

Polyester concrete shall consist of polyester resin binder and dry graded concrete aggregate. The resin shall be an unsaturated isophthalic polyester-styrene copolymer conforming to the following:

POLYESTER RESIN BINDER		
PROPERTY	REQUIREMENT	TEST METHOD
* Viscosity	75 to 200 cps (RVT, No. 1 Spindle, 20 RPM at 77° F.)	ASTM D 2196
* Specific Gravity	1.05 to 1.10 at 77° F.	ASTM D 1475
Elongation	35 percent minimum Type I at 0.45 in./min. Thickness= 0.25±0.03in.	ASTM D 638
	Sample Conditioning: 18/25/50 + 5/70	ASTM D 618
Tensile Strength	2,500 psi minimum Type I at 0.45 in./min. Thickness= 0.25±0.03in.	ASTM D 638
	Sample Conditioning: 18/25/50 + 5/70	ASTM D 618
* Styrene Content	40 percent to 50 percent (by weight)	ASTM D 2369
Silane Coupler	1.0 percent, minimum (by weight of polyester styrene resin)	
PCC Saturated Surface-Dry Bond Strength	500 psi, minimum at 24 hours and 70±2° F.	California Test 551
* Test shall be performed prior to adding initiator.		

The silane coupler shall be an organosilane ester, gammamethacryloxypropyltrimethoxysilane. The promoter shall be compatible with suitable methyl ethyl ketone peroxide (MEKP) and cumene hydroperoxide (CHP) initiators.

Aggregate for polyester concrete shall conform to the provisions in Section 90-2.02, "Aggregates," of the Standard Specifications and either of the following combined aggregate gradings:

COMBINED AGGREGATE		
Sieve Size	3/8" Max. Percent Passing	No.4 Sieve Max. Percent Passing
1/2"	100	100
3/8"	83 - 100	100
No. 4	65 - 82	62 - 85
No. 8	45 - 64	45 - 67
No. 16	27 - 48	29 - 50
No. 30	12 - 30	16 - 36
No. 50	6 - 17	5 - 20
No. 100	0 - 7	0 - 7
No. 200	0 - 3	0 - 3

Aggregate retained on the No. 8 sieve shall have a maximum of 45 percent crushed particles when tested in accordance with California Test 205. Fine aggregate shall consist of natural sand only.

Aggregate absorption shall not exceed one percent when tested in accordance with California Test 206 and 207.

At the time of mixing with the resin, the moisture content of the aggregate, as determined by California Test 226, shall not exceed one half of the aggregate absorption.

Prior to placing polyester concrete, a prime coat shall be applied.

The prime coat shall be either a wax free high molecular weight methacrylate resin or a 100 percent reactive wax-free unsaturated diaromatic oxide glycol fumerate modified polyester resin.

The HMWM resin shall conform to the following:

High Molecular Weight Methacrylate (HMWM) Resin		
PROPERTY	REQUIREMENT	TEST METHOD
* Viscosity	25 cps, maximum, (Brookfield RVT with UL adaptor, 50 RPM at 77° F.)	ASTM D 2196
* Specific Gravity	0.90, minimum, at 77° F.	ASTM D 1475
* Flash Point	180° F., minimum	ASTM D 3278
* Vapor Pressure	1.0 mm Hg, maximum, at 77° F.	ASTM D 323
Tack-free time	400 minutes, maximum at 77° F.	California Test 551
PCC Saturated Surface-Dry Bond Strength	500 psi, minimum at 24 hours and 70±2° F.	California Test 551
* Test shall be performed prior to adding initiator.		

The promoter/initiator system for the methacrylate resin shall consist of a metal drier and peroxide. If supplied separately from the resin, the metal drier shall at no time be mixed directly with the peroxide. The containers shall not be stored in a manner that will allow leakage or spillage from one material to contact the containers or material of the other.

The fumerate modified polyester resin shall have the following unfilled resin characteristics:

Unfilled Resin Characteristics		
PROPERTY	REQUIREMENT	TEST METHOD
* Viscosity	100 to 200 cps (RVT, No. 1 Spindle, 20 RPM at 77° F.)	ASTM D 2196
* Specific Gravity	1.00 to 1.03 at 77° F.	ASTM D 1475
Elongation	12 percent maximum Type I at 0.45 in./min. Thickness= 0.25±0.03in.	ASTM D 638
	Sample Conditioning: 18/25/50 + 5/70	ASTM D 618
Tensile Strength	5,000 psi minimum Type I at 0.45 in./min. Thickness= 0.25±0.03in.	ASTM D 638
	Sample Conditioning: 18/25/50 + 5/70	ASTM D 618
* Styrene Content	45 percent to 55 percent (by weight)	ASTM D 2369
Silane Coupler	2.0 percent, minimum (by weight of polyester styrene resin)	
Heat Distortion	220° F. to 240° F. at 264 psi.	ASTM D 648
Barcol Hardness	30 to 40 at 77° F.	ASTM D 2583
* Test shall be performed prior to adding initiator.		

The silane coupler shall be an organosilane ester, gammamethacryloxypropyltrimethoxysilane. The promoter shall be compatible with suitable methyl ethyl ketone peroxide (MEKP) and cumene hydroperoxide (CHP) initiators.

A Material Safety Data Sheet shall be furnished prior to use for each shipment of polyester resin binder and prime coat.

The Contractor shall allow 14 days for sampling and testing of the polyester resin binder and high molecular weight methacrylate resin prior to proposed use.

Cleaning the contact surfaces and joints shall be done by abrasive blasting before placing prime coat or installing joint seals.

After abrasive blast cleaning, the area to receive the prime coat shall be dry and blown clean by compressed air to remove accumulated dust and any other loose material. The surface temperature shall be between 50° F and 100° F when the prime coat is applied.

The prime coat shall be uniformly applied to completely cover the surface to receive the polyester concrete. The rate of spread shall be approximately one gallon per 100 square feet of surface.

The catalyst system shall be added to the HMWM resin as specified by the resin supplier. Under field conditions, the HMWM resin shall have a gel time between 30 and 90 minutes when tested in accordance with California Test 434 in a 120 ml volume.

The prime coat shall be allowed to cure a minimum of 15 minutes before placing polyester concrete. If the prime coat becomes contaminated, the contaminated area shall be cleaned by abrasive blasting and reprimed at the Contractor's expense.

Polyester concrete shall be mixed in mechanically operated mixers. The polyester resin binder in the concrete shall be approximately 12 percent by weight of the dry aggregate, the exact percentage will be determined by the Engineer.

The amount of initiator used in polyester concrete shall be sufficient to produce initial set time between 30 and 120 minutes during placement. The initial set time will be determined by using an initial-setting time Gillmore needle in conformance with the requirements of ASTM Designation: C 266. Accelerators or inhibitors may be required to achieve proper set times and shall be used as recommended by the resin supplier.

The resin binder shall be initiated and thoroughly blended just prior to mixing with aggregate. The polyester concrete shall be mixed a minimum of 2 minutes prior to placing.

Polyester concrete shall be placed prior to gelling and within 15 minutes following addition of initiator, whichever occurs first. Polyester concrete that is not placed within this time shall be discarded.

The surface temperature of the area to receive polyester concrete shall be the same as specified above for the prime coat.

The polyester concrete shall be thoroughly tamped into place and surfaces shall be struck off to the required grade.

Exposed surfaces shall receive a non-skid finish provided by sprinkling sand onto the top surface of the polyester concrete prior to gelling. The sand shall be commercial quality blast sand conforming to the quality and dryness requirements for polyester concrete aggregate as specified in these special provisions. Ninety five percent of the sand shall pass the No. 8 sieve, and 95 percent shall be retained on the No. 20 sieve.

The polyester concrete dam shall be protected from moisture, traffic, and equipment for a minimum of 4 hours following final finishing. The protection time shall be extended if additional time is required to avoid damaging the polyester concrete, as determined by the Engineer.

Polyester concrete for expansion dams will be measured by the cubic foot as expansion dam in conformance with the nominal dimensions shown on the plans. No deduction will be made for volume occupied by bar reinforcing steel.

The contract price paid per cubic foot for expansion dam shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in constructing expansion dams, complete in place, including polyester concrete, sawing and removing portions of the existing expansion dam, removing portland cement concrete, removing and disposing of asphalt concrete, preparing and cleaning contact surfaces, furnishing and placing bar reinforcing steel and dowels, furnishing and applying prime coat, and placing expansion dams, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.45 PRECAST PRESTRESSED CONCRETE BRIDGE MEMBERS

Precast prestressed concrete members shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

The anticipated deflection and method of accommodation of deflection of precast prestressed concrete girders, prior to the time the deck concrete is placed, shall be shown on the working drawings in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The deflection shall include the following:

1. Anticipated upward deflection caused by the prestressing forces.
2. Downward deflection caused by the dead load of the girder.
3. Deflection caused by the creep and shrinkage of the concrete for the time interval between the stressing of the girders and the planned placement of the deck.

Such deflection shall be substantiated by calculations that consider the ages of the girder concrete at the time of stressing and the Contractor's planned placement of the deck. All deflection calculations shall be based on the concrete producer's estimate of the modulus of elasticity at the applicable concrete age.

Adjustments to accommodate girder deflections, which occur prior to the time the deck concrete is placed, may include revisions in bearing seat elevations, but any such adjustments shall be limited by the following conditions:

- A. The minimum permanent vertical clearance under the structure as shown on the plans shall not be reduced.
- B. The profile grade and cross slope of the deck shall not be changed.
- C. A minimum of one inch of deck slab concrete between the top of the precast girders and the deck slab reinforcement shall be maintained.

Girders with unanticipated girder deflection and which cannot comply with conditions A, B and C will be rejected in accordance with the provisions in Section 6-1.04, "Defective Materials."

Adjustments to accommodate girder deflections will not be considered a change in dimensions. Full compensation for increases in the cost of construction, including increases in the quantity of deck or bearing seat concrete, resulting from adjustments to accommodate girder deflections shall be considered as included in the contract price paid for the various items of work involved and no additional compensation will be allowed therefor.

Temporary lateral bracing shall be provided for girders located over public roadways. The bracing shall be installed at each end of each girder, except notched ends, prior to the release of the erection equipment from the girder and shall remain in place until 2 days after the concrete diaphragms have been placed. The bracing shall be adequate to prevent overturning of the girders prior to completion of the work and as a minimum shall be capable of resisting a lateral force of 15 pounds per square foot of girder side area applied laterally in either direction to the top of the girder. Girder erection shall not be started until the temporary lateral bracing proposed for use by the Contractor has been approved by the Engineer.

10-1.46 CLOSURE WALLS

Concrete closure walls used to curtain off open areas at bridges shall conform to the details shown on the plans and the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

The closure walls shall be constructed in conformance with either Alternative 1, 2 or 3 as shown on the plans, at the option of the Contractor.

For prestressed concrete panels, the provisions in Section 50-1.02, "Drawings," of the Standard Specifications shall not apply. The Contractor shall submit 2 sets of working drawings to the Engineer for use in administering the contract. The drawings shall show the panel dimensions, materials, prestressing methods, tendon arrangement and working stresses, including any addition or rearrangement of reinforcing steel from that shown on the plans. Prestressing steel shall be placed not more than 6 inches from the edges of the panel and spaced at not more than 18 inch on center between the edge tendons.

Anchorage details consisting of bars and bolts shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications. The bolt holes shall conform to the provisions in Section 55-3.14A, "Bolt Holes," of the Standard Specifications, except that holes shall not be punched to full size and the finished hole sizes shall be as shown on the plans.

Precast panels shall have an exposed surface matching the adjacent cast-in-place concrete.

The quantity of concrete closure wall will be measured by the square foot on the outside surface of the completed panels.

The contract price paid per square foot for concrete closure wall shall include full compensation for furnishing all labor, materials (including reinforcement, prestressing steel, and anchorages), tools, equipment, and incidentals, and for doing all the work involved in constructing the closure wall complete in place, including erecting precast panels, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for excavation and backfill at the base of closure walls shall be considered as included in the contract price paid per square foot for concrete closure wall and no separate payment will be made therefor.

Full compensation for access openings in closure walls shall be considered as included in the contract price paid per square foot for concrete closure wall and no separate payment will be made therefor.

10-1.47 STRUCTURE APPROACH SLABS (Type N)

This work shall consist of constructing reinforced concrete approach slabs, structure approach drainage system, and treated permeable base at structure approaches in conformance with the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications, and these special provisions.

GENERAL

Attention is directed to the section "Engineering Fabrics" of these special provisions.

STRUCTURE APPROACH DRAINAGE SYSTEM

GEOCOMPOSITE DRAIN

Geocomposite drain shall consist of a manufactured core not less than 0.25-inch thick nor more than 2 inches thick with one or both sides covered with a layer of filter fabric that will provide a drainage void. The drain shall produce a flow rate, through the drainage void, of at least 2.0 gallons per minute per foot width at a hydraulic gradient of 1.0 and a minimum externally applied pressure of 3,500 pounds per square foot.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished for the geocomposite drain certifying that the drain produces the required flow rate and complies with these special provisions. The Certificate of Compliance shall be accompanied by a flow capability graph for the geocomposite drain showing flow rates and the externally applied pressures and hydraulic gradients. The flow capability graph shall be stamped with the verification of an independent testing laboratory.

Filter fabric for the geocomposite drain shall conform to the provisions for fabric for underdrains in Section 88, "Engineering Fabrics," of the Standard Specifications, and these special provisions.

The manufactured core shall be either a preformed grid of embossed plastic, a mat of random shapes of plastic fibers, a drainage net consisting of a uniform pattern of polymeric strands forming 2 sets of continuous flow channels, or a system of plastic pillars and interconnections forming a semirigid mat.

The core material and filter fabric shall be capable of maintaining the drainage void for the entire height of geocomposite drain. Filter fabric shall be integrally bonded to the side of the core material with the drainage void. Core material manufactured from impermeable plastic sheeting having nonconnecting corrugations shall be placed with the corrugations approximately perpendicular to the drainage collection system.

The geocomposite drain shall be installed with the drainage void and the filter fabric facing the embankment. The fabric facing the embankment side shall overlap a minimum of 3 inches at all joints and wrap around the exterior edges a minimum of 3 inches beyond the exterior edge. If additional fabric is needed to provide overlap at joints and wrap-

around at edges, the added fabric shall overlap the fabric on the geocomposite drain at least 6 inches and be attached thereto.

Should the fabric on the geocomposite drain be torn or punctured, the damaged section shall be replaced completely or repaired by placing a piece of fabric that is large enough to cover the damaged area and provide a 6-inch overlap.

PLASTIC PIPE

Plastic pipe shall conform to the provisions for pipe for edge drains and edge drain outlets in Section 68-3, "Edge Drains," of the Standard Specifications.

DRAINAGE PADS

Concrete for use in drainage pads shall be minor concrete, except the concrete shall contain not less than 470 pounds of cement per cubic yard.

TREATED PERMEABLE BASE AT BOTTOM OF GEOCOMPOSITE DRAINS

Treated permeable base to be placed around the slotted plastic pipe at the bottom of geocomposite drains shall conform to the provisions in "Treated Permeable Base Under Approach Slabs." If asphalt treated permeable base is used, it shall be placed at a temperature of not less than 180° F. nor more than 230° F.

The filter fabric to be placed over the treated permeable base at the bottom of geocomposite drains shall conform to the provisions for filter fabric for edge drains in Section 88, "Engineering Fabrics," of the Standard Specifications.

ENGINEERING FABRICS

Filter fabric to be placed between the structure approach embankment material and the treated permeable base shall conform to the provisions for filter fabric for edge drains in Section 88, "Engineering Fabrics," of the Standard Specifications and these special provisions.

The subgrade to receive the filter fabric, immediately prior to placing, shall conform to the compaction and elevation tolerance specified for the material involved.

Filter fabric shall be aligned, handled and placed in a wrinkle-free manner in conformance with the manufacturer's recommendations.

Adjacent borders of the filter fabric shall be overlapped from 12 to 18 inches or stitched. The preceding roll shall overlap the following roll in the direction the material is being spread or shall be stitched. When the fabric is joined by stitching, it shall be stitched with yarn of a contrasting color. The size and composition of the yarn shall be as recommended by the fabric manufacturer. The stitches shall number 5 to 7 per inch of seam.

Equipment or vehicles shall not be operated or driven directly on the filter fabric.

Woven tape fabric to be placed between the treated permeable base and the approach slab shall be a fabric made of woven strips or tapes and shall conform to the following:

Specification	ASTM Designation	Requirement
Weight, ounces per square yard, min.	D 3776	3.0
Grab Tensile Strength, pounds, min.	D 4632	50
Elongation, percent, max.	D 4632	35
Toughness, pounds, min. (Percent elongation times grab tensile strength)	----	1,200

Woven tape fabric shall be treated to provide a minimum of 70 percent breaking strength retention after 500 hours exposure when tested in conformance with the requirements in ASTM Designation: D 4355. The Contractor shall notify the Engineer, in writing, of the source of woven tape fabric at least 45 days prior to use.

TREATED PERMEABLE BASE UNDER APPROACH SLAB

Treated permeable base under structure approach slabs shall consist of constructing either an asphalt treated permeable base or a cement treated permeable base in conformance with Section 29, "Treated Permeable Bases," of the Standard Specifications and these special provisions.

The type of treatment, asphalt or cement, to be used shall be at the option of the Contractor.

Not less than 30 days prior to the start of placing the treated permeable base, the Contractor shall notify the Engineer, in writing, which type of treated permeable base will be furnished. Once the Contractor has notified the Engineer of the selection, the type to be furnished shall not be changed without a prior written request to do so and approval thereof in writing by the Engineer.

Asphalt treated permeable base shall be placed at a temperature of not less than 200° F. nor more than 250° F. Material stored in excess of 2 hours shall not be used in the work.

Asphalt treated permeable base material may be spread in one layer. The base material shall be compacted with a vibrating shoe type compactor or rolled with a roller weighing not less than 1 1/2 tons nor more than 5 tons. Rolling shall begin as soon as the mixture has cooled sufficiently to support the weight of the rolling equipment without undue displacement.

Cement treated permeable base material may be spread in one layer. The base material shall be compacted with either a vibrating shoe type compactor or with a steel-drum roller weighing not less than 1 1/2 tons nor more than 5-tons. Compaction shall follow within one-half hour after the spreading operation and shall consist of 2-complete coverages of the treated material.

APPROACH SLABS

Concrete for use in approach slabs shall contain not less than 658 pounds of cement per cubic yard.

Miscellaneous steel parts and all steel components of abutment ties including plates, nuts, washers, and rods shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications. Bar reinforcement that has an unbonded portion shall be galvanized in conformance with the provisions in Section 75-1.05, "Galvanizing," of the Standard Specifications.

Structure approach slabs shall be cured for not less than 5 days prior to opening to public traffic, unless, at the option of the Contractor, the structure approach slabs are constructed using concrete with a non-chloride Type C chemical admixture conforming to these special provisions.

Portland cement for use in concrete using a non-chloride Type C chemical admixture shall be Type II Modified, Type II Prestress, or Type III. Type II Modified and Type III cement shall conform to the provisions in Section 90-2.01, "Portland Cement," of the Standard Specifications. Type II Prestress cement shall conform to the requirements of Type II Modified cement, except the mortar containing the portland cement to be used and Ottawa sand, when tested in conformance with California Test 527, shall not contract in air more than 0.053 percent.

The non-chloride Type C chemical admixture, approved by the Engineer, shall conform to the requirements in ASTM Designation: C 494 and Section 90-4, "Admixtures," of the Standard Specifications.

The concrete with non-chloride Type C chemical admixture shall be prequalified prior to placement in conformance with the provisions for prequalification of concrete specified by compressive strength in Section 90-9.01, "General," of the Standard Specifications and the following:

Immediately after fabrication of the 5 test cylinders, the cylinders shall be stored in a temperature medium of 70 ± 3 degrees F until the cylinders are tested.

The 4-hour average strength of the 5 test cylinders shall not be less than 850 psi. No more than 2 test cylinders shall have a strength of less than 800 psi.

Building paper shall be commercial quality No. 30 asphalt felt.

Polyvinyl chloride (PVC) conduit used to encase the abutment tie rod shall be of commercial quality.

The top surface of approach slabs shall be finished in conformance with the provisions in Section 51-1.17, "Finishing Bridge Decks," of the Standard Specifications. Edges of slabs shall be edger finished.

Approach slabs shall be cured with pigmented curing compound (1) in conformance with the provisions for curing structures in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications.

Structure approach slabs constructed using concrete with a non-chloride Type C chemical admixture shall be cured for not less than 4 hours prior to opening to public traffic. The curing period shall be considered to begin at the start of discharge of the last truck load of concrete to be used in the slab.

If the ambient temperature is below 65° F during the curing period for approach slabs using concrete with a non-chloride Type C chemical admixture, an insulating layer or blanket shall cover the surface. The insulation layer or blanket shall have an R-value rating given in the table below. At the Contractor's option, a heating tent may be used in lieu of or in combination with the insulating layer or blanket.

TEMPERATURE RANGE DURING CURING PERIOD	R-VALUE, MINIMUM
55° F. through 64° F.	1
45° F. through 54° F.	2
40° F. through 44° F.	3

JOINTS

Hardboard and expanded polystyrene shall conform to the provisions in Section 51-1.12D, "Sheet Packing, Preformed Pads and Board Fillers," of the Standard Specifications.

Type AL joint seals shall conform to the provisions in Section 51-1.12F, "Sealed Joints" of the Standard Specifications. The sealant may be mixed by hand-held power-driven agitators and placed by hand methods.

The pourable seal between the steel angle and concrete barrier shall conform to the requirements for Type A and AL seals in Section 51-1.12F(3), "Materials and Installation," of the Standard Specifications. The sealant may be mixed by hand-held power-driven agitators and placed by hand methods. Immediately prior to placing the seal, the joint shall be thoroughly cleaned, including abrasive blast cleaning of the concrete surfaces, so that all foreign material and concrete spillage are removed from all joint surfaces. Joint surfaces shall be dry at the time the seal is placed.

MEASUREMENT AND PAYMENT

Structural concrete, approach slab (Type N) will be measured and paid for in conformance with the provisions in Section 51-1.22, "Measurement," and Section 51-1.23, "Payment," of the Standard Specifications and these special provisions.

Full compensation for the structure approach drainage system including geocomposite drain, plastic pipe, drainage pads, treated permeable base, filter fabric, woven tape fabric, miscellaneous metal, pourable seals, shall be considered as included in the contract price paid per cubic yard for structural concrete, approach slab of the type shown in the Engineer's Estimate and no additional compensation will be allowed therefor.

10-1.48 STRUCTURE APPROACH SLABS (TYPE R)

Structure approach slabs (Type R) shall consist of removing portions of existing structures, existing pavement and base including reinforced concrete approach slabs, asphalt concrete surfacing, portland cement concrete pavement, subsealing material and cement treated base and constructing new reinforced concrete approach slabs at structure approaches as shown on the plans and in conformance with these special provisions.

GENERAL

The thickness shown on the plans for structure approach slabs is the minimum thickness. The thickness will vary depending on the thickness of the pavement and base materials removed.

Where pavement subsealing has been performed under existing approach slabs, the subsealing material shall be removed for its full depth. Where removal of cement treated base is required to construct the approach slab, the entire thickness of the cement treated base shall be removed.

Voids between the new reinforced structure approach slab and the base material remaining in place that are caused by removal of subsealing material or cement treated base shall be filled, at the option of the Contractor, with aggregate base (approach slab) or structure approach slab concrete.

The Contractor shall establish a grade line for new approach slabs by setting stringlines on each side of the proposed approach slab. The stringlines shall start approximately 100 feet from the structure and extend approximately 50 feet onto the structure. The stringlines shall be adjusted as necessary to provide a smooth profile grade for the new approach slab. The profile grade will be subject to the approval of the Engineer.

The Contractor shall schedule his operations so that the pavement and base materials removed during a work period shall be replaced, in that same work period, with approach slab concrete that shall be cured for at least 4 hours prior to the time the lane is to be opened to public traffic as designated in "Maintaining Traffic" of these special provisions. In the event the existing pavement and base materials are removed and the Contractor is unable, as determined by the Engineer, to construct, finish and cure the new approach slab by the time the lane is to be opened to public traffic, the excavation shall be filled with a temporary roadway structural section as specified in this section, "Structure Approach Slabs (Type R)."

At locations where the removal of existing materials and approach slab construction is not required to be completed within the same work period, the requirements for "Temporary Roadway Structural Section" shall not apply. The Contractor shall have the option of:

- 1) Curing the approach slab concrete for not less than 5 days prior to opening to public traffic, or

2) Constructing the approach slab using concrete with a non-chloride Type C chemical admixture and curing the approach slab concrete at least 6 hours prior to opening to public traffic.

TEMPORARY ROADWAY STRUCTURAL SECTION

A sufficient standby quantity, as determined by the Engineer, of asphalt concrete and aggregate base shall be provided at the project site for construction of a temporary roadway structural section where existing approaches to structures are being replaced. The temporary structural section shall be maintained and later removed as a first order of work when the Contractor is able to construct and cure the approach slab within the prescribed time limit. The temporary structural section shall consist of 0.3-foot thick layer of asphalt concrete over aggregate base.

The aggregate base for the temporary structural section shall conform to the requirements specified under "Aggregate Base (Approach Slab)" of these special provisions.

The asphalt concrete for the temporary structural section shall be produced from commercial quality aggregates and asphalt binder. The grading of the aggregate shall conform to the 3/4 inch maximum medium grading in Section 39-2.02, "Aggregate," of the Standard Specifications and the asphalt binder shall conform to the requirements of liquid asphalt SC-800 in Section 93, "Liquid Asphalts," of the Standard Specifications. The amount of asphalt binder to be mixed with the aggregate shall be approximately 0.3-percent less than the optimum bitumen content as determined by California Test 367.

Aggregate base and asphalt concrete for the temporary structural section shall be spread and compacted by methods that will produce a well-compacted, uniform base, free from pockets of coarse or fine material and a surfacing of uniform smoothness, texture, and density. The aggregate base and the asphalt concrete may each be spread and compacted in one layer. The finished surface of the asphalt concrete shall not vary more than 0.05-foot from the lower edge of a 12-foot straightedge placed parallel with the centerline and shall match the elevation of the existing concrete pavement and structure along the joints between the existing pavement and structure and the temporary surfacing.

The material from the removed temporary structural section shall be disposed of outside the highway right of way in conformance with Section 7-1.13 of the Standard Specifications except that removed aggregate base may be stockpiled at the project site and reused for construction of another temporary structural section. When no longer required, standby material or stockpiled material for construction of temporary structural sections shall be removed and disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13.

REMOVING PORTIONS OF EXISTING STRUCTURES

Attention is directed to "Existing Highway Facilities" of these special provisions.

REMOVING EXISTING PAVEMENT AND BASE MATERIALS

The outline of portland cement concrete to be removed shall be sawed full depth with a power-driven concrete saw.

The outlines of excavations in asphalt concrete shall be cut on a neat line to a minimum depth of 0.25-foot with a power-driven concrete saw or wheel-type rock cutting excavator before any asphalt concrete material is removed. These excavations shall be permanently or temporarily backfilled to conform to the grade of the adjacent pavement prior to opening the lane to public traffic. Surplus excavated material may be used as temporary backfill material.

Regardless of the type of equipment used to remove concrete within the sawed outline, the surface of the concrete to be removed shall not be impacted within 1.5 feet of the pavement to remain in place. Removing existing pavement and base materials shall be performed without damage to the adjacent structure or pavement that is to remain in place. Damage to the structure or to pavement that is to remain in place shall be repaired to a condition satisfactory to the Engineer. Damaged pavement shall be removed and replaced with new concrete pavement if ordered by the Engineer. Repairing damage to structures or repairing or removing and replacing damaged pavement outside the limits of structure approach slabs shall be at the Contractor's expense.

Materials removed shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13 of the Standard Specifications.

The base material remaining in-place, after removing the existing pavement and base materials to the required depth, shall be graded uniformly, watered, and compacted. The finished surface of the base material at any point shall not extend above the grade approved by the Engineer.

Areas of the base material that are low as a result of over excavation shall be filled, at the Contractor's expense, with structure approach slab concrete at the time and in the same operation that the new concrete is placed.

AGGREGATE BASE (APPROACH SLAB)

The aggregate base (approach slab) for filling voids below the reinforced structure approach slab concrete shall be produced from commercial quality aggregates consisting of broken stone, crushed gravel or natural rough-surfaced gravel, and sand, or any combination thereof. The grading of the aggregate base shall conform to the 3/4 inch maximum grading specified in Section 26-1.02A, "Class 2 Aggregate Base," of the Standard Specifications.

Aggregate base (approach slab) for filling voids below the reinforced structure approach slab concrete shall be spread and compacted by methods that will produce a well-compacted, uniform base, free from pockets of coarse or fine material. The aggregate base shall be watered and compacted to the grade approved by the Engineer. Where the required thickness of aggregate base is 0.67-foot or less, the base may be spread and compacted in one layer. Where the required thickness of aggregate base is more than 0.67-foot, the base shall be spread and compacted in 2 or more layers of approximately equal thickness. The maximum compacted thickness of any one layer shall not exceed 0.67-foot. The finished surface of the base material at any point shall not extend above the grade approved by the Engineer. Areas of the base material that are lower than the grade approved by the Engineer, shall be filled with structure approach slab concrete at the time and in the same operation that the new concrete is placed.

STRUCTURE APPROACH SLAB

Reinforced concrete approach slabs shall conform to the provisions for approach slabs in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Concrete for use in approach slabs shall contain not less than 658 pounds of cement per cubic yard.

Miscellaneous steel parts and all steel components of abutment ties including plates, nuts, washers, and rods shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

Approach slab concrete that requires a minimum curing period of 4 hours shall be constructed using a non-chloride Type C chemical admixture. Mineral admixture will not be required in this concrete.

Portland cement for use in concrete using a non-chloride Type C chemical admixture shall be Type II Modified, Type II Prestress, or Type III. Type II Modified and Type III cement shall conform to the provisions in Section 90-2.01, "Portland Cement," of the Standard Specifications. Type II Prestress cement shall conform to the requirements of Type II Modified cement, except the mortar containing the portland cement to be used and Ottawa sand, when tested in conformance with California Test 527, shall not contract in air more than 0.053 percent.

The non-chloride Type C chemical admixture shall be approved by the Engineer and shall conform to the requirements in ASTM Designation: C 494 and Section 90-4, "Admixtures," of the Standard Specifications.

The concrete with non-chloride Type C chemical admixture shall be prequalified prior to placement in conformance with the provisions for prequalification of concrete specified by compressive strength in Section 90-9.01, "General," of the Standard Specifications and the following:

Immediately after fabrication of the 5 test cylinders, the cylinders shall be stored in a temperature medium of 70 ± 3 degrees F until the cylinders are tested.

The 4-hour average strength of the 5 test cylinders shall not be less than 850 psi. No more than 2 test cylinders shall have a strength of less than 800 psi.

Building paper shall be commercial quality No. 30 asphalt felt.

Polyvinyl chloride (PVC) conduit used to encase the abutment tie rod shall be commercial quality.

Bar reinforcement or abutment tie rods in drilled holes shall be bonded in conformance with the provisions for drilling and bonding dowels in Section 83-2.02D(1), "General," of the Standard Specifications.

The top surface of approach slabs shall be finished in conformance with the provisions in Section 51-1.17, "Finishing Bridge Decks," of the Standard Specifications. The finished top surface shall not vary more than 0.02-foot from the lower edge of a 12-foot straightedge placed parallel with the centerline. Edges of slabs shall be edger finished.

The surface of the approach slab will not be profiled and the Profile Index requirements shall not apply.

Approach slabs shall be cured with pigmented curing compound (1) in conformance with the provisions for curing structures in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications. The minimum curing period as specified in this section-"Structure Approach Slabs (Type R)" shall be considered to begin at the start of discharge of the last truck load of concrete to be used in the slab. Fogging of the surface with water after the curing compound has been applied will not be required. Should the film of curing compound be damaged from any cause before the approach slab is opened to public traffic, the damaged portion shall be repaired immediately with additional compound, at the Contractor's expense. Damage to the curing compound after the approach slab is opened to public traffic shall not be repaired.

If the ambient temperature is below 65° F. during the curing period, an insulating layer or blanket shall cover the surface. The insulation layer or blanket shall have an R-value rating given in the table below. At the Contractor's option, a heating tent may be used in lieu of or in combination with the insulating layer or blanket:

TEMPERATURE RANGE DURING CURING PERIOD	R-VALUE, MINIMUM
55° F. through 64° F.	1
45° F. through 54° F.	2
40° F. through 44° F.	3

Tests to determine the coefficient of friction of the final textured surface will be made only if the Engineer determines by visual inspection that the final texturing may not have produced a surface having the specified coefficient of friction. Tests to determine the coefficient of friction will be made after the approach slab is opened to public traffic, but not later than 5 days after concrete placement. The coefficient of friction will be measured by California Test 342. Portions of completed concrete surfaces that are found to have a coefficient of friction less than 0.35 shall be ground or grooved parallel to the center line in conformance with the provisions for bridge decks in Section 42, "Groove and Grind Pavement," of the Standard Specifications.

JOINTS

Hardboard and expanded polystyrene shall conform to the provisions in Section 51-1.12D, "Sheet Packing, Preformed Pads and Board Fillers," of the Standard Specifications.

Type AL joint seals shall conform to the provisions in Section 51-1.12F, "Sealed Joints" of the Standard Specifications. The sealant may be mixed by hand-held power-driven agitators and placed by hand methods.

The pourable seal between the steel angle and concrete barrier shall conform to the requirements for Type A and AL seals in Section 51-1.12F(3), "Materials and Installation," of the Standard Specifications. The sealant may be mixed by hand-held power-driven agitators and placed by hand methods. Immediately prior to placing the seal, the joint shall be thoroughly cleaned, including abrasive blast cleaning of the concrete surfaces, so that all foreign material and concrete spillage are removed from all joint surfaces. Joint surfaces shall be dry at the time the seal is placed.

MEASUREMENT AND PAYMENT

Structural concrete, approach slab (Type R) will be measured and paid for in conformance with the provisions in Section 51-1.22, "Measurement," and Section 51-1.23, "Payment," of the Standard Specifications and these special provisions.

Full compensation for removing and disposing of portions of existing pavement materials, and for furnishing and placing miscellaneous metal, Type AL joint seals, and pourable seals shall be considered as included in the contract price paid per cubic yard for structural concrete, approach slab (Type R) and no separate payment will be made therefor.

The quantity of aggregate base (approach slab) to be paid for shall include the actual volume of aggregate base (approach slab) used to fill voids below the reinforced structure approach slab concrete, except for the volume of areas low as a result of over excavation. The volume to be paid for will be calculated on the basis of the constructed length, width, and thickness of the filled voids. Structure approach slab concrete used to fill voids lower than the approved grade of the base, except for the areas low as a result of over excavation by the Contractor, will be measured and paid for by the cubic yard as aggregate base (approach slab).

No adjustment of compensation will be made for any increase or decrease in the quantity of aggregate base (approach slab) required, regardless of the reason for such increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications shall not apply to the item of aggregate base (approach slab).

The contract price paid per cubic yard for aggregate base (approach slab) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing aggregate base (approach slab), complete in place, including excavation, and removing and disposing of base and subsealing materials, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for furnishing, stockpiling, and disposing of standby material for construction of temporary structural sections; and for constructing, maintaining, removing, and disposing of temporary structural sections shall be considered as included in the contract price paid per cubic yard for structural concrete, approach slab (Type R) and no separate payment will be made therefor.

Full compensation for drilling and bonding of bar reinforcement or abutment tie rods shall be considered as included in the contract price paid per cubic yard for structural concrete, approach slab (Type R) and no separate payment will be made therefor.

10-1.49 STRUCTURE TRANSITION SLAB

Structural concrete, transition slab shall conform to the provisions for approach slab (Type N) in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Falsework shall be designed, constructed, and removed in conformance with the requirements in Section 51-1.06, "Falsework," of the Standard Specification and these special provisions.

Transition slabs shall be finished in conformance with the requirements in Section 51-1.17, "Finishing Bridge Decks," of the Standard Specification and these special provisions.

Structural concrete, transition slab will be measured and paid for by the cubic yard.

The contract price paid per cubic yard for structural concrete, transition slab shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in structural concrete, transition slab, complete in place, and for furnishing and placing reinforcing steel as shown on the plans, as specified in the Standard Specifications and these special provisions and as directed by the Engineer.

Full compensation for placing cement treated permeable base, for removing existing subbase, and for placing treated permeable base under the transition slab at the Stewart Street OR UC (Widen), Bridge Number 53-1030, shall be considered as included in the contract price paid per cubic yard for structural concrete, transition slab, and no separate payment will be made therefor.

Full compensation for furnishing and installing joint seal (Type AL) at transition slabs shall be considered as included in the contract price paid per cubic yard for structural concrete, transition slab and no separate payment will be made therefor.

10-1.50 PAVING NOTCH EXTENSION

This work shall consist of extending existing paving notches in conformance with the details shown on the plans and in conformance with these special provisions.

Concrete for the paving notch extensions shall conform to the requirements for structure approach slab concrete of these special provisions.

At least 12 hours shall elapse between the time of placing concrete for the paving notch extension and placing concrete for the structure approach slab.

The construction joint between the paving notch extension and the existing abutment shall conform to the provisions for horizontal construction joints in Section 51-1.13, "Bonding," of the Standard Specifications. Concrete shall be placed in the spalled portions of the existing paving notch concurrently with the concrete for the paving notch extension.

Bar reinforcing steel shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications.

Structure excavation and backfill shall conform to the provisions in Section 19-3, "Structure Excavation and Backfill," of the Standard Specifications.

Drilling of holes and bonding of reinforcing steel dowels shall conform to the provisions for drilling and bonding dowels in Section 83-2.02D(1), "General," of the Standard Specifications.

The quantity of concrete for paving notch extension will be measured by the cubic yard. The volume to be paid for will be calculated from the dimensions shown on the plans or other dimensions that may be ordered in writing by the Engineer.

The contract price paid per cubic yard for paving notch extension shall include full compensation for furnishing all labor, materials (including concrete for the paving notch spalled areas), tools, equipment, and incidentals, and for doing all the work involved in constructing the paving notch extension, complete in place, including structure excavation and backfill, reinforcement, and drilling and bonding dowels as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.51 SOUND WALL

DESCRIPTION.--This work shall consist of constructing sound walls of masonry block. Sound walls shall be supported on concrete barriers or retaining walls as shown on the plans.

The Contractor shall submit 2 sets of elevation and plan layout drawings to the Engineer, as provided in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The drawings shall be to scale and shall show the proposed top and bottom elevation lines. The top and bottom elevation lines shown on the plans are minimum and they shall be fully contained in the proposed layout drawings. The drawings shall include, within the limits shown on the plans, the panel sizes, pile spacing, post spacing, footing steps, aesthetic features, locations of expansion joints, access gates and electrolier openings. The Contractor shall allow two weeks after complete drawings are submitted for review.

SOUND WALL (BARRIER) (MASONRY BLOCK).--Sound wall (barrier) (masonry block), consisting of a reinforced hollow unit masonry block stem, shall conform to the provisions in Sections 19, "Earthwork," 52, "Reinforcement," and 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

Sound wall masonry unit stems shall be constructed with joints of portland cement mortar. Wall stems shall be constructed with hand laid block. Wall stems shall not be constructed with preassembled panels.

Concrete for sound wall footings, pile caps and grade beams, if needed, shall conform to the provisions in Section 90-10, "Minor Concrete," of the Standard Specifications.

Reinforcing bars shall conform to ASTM Designation: A 706.

Concrete masonry units shall be hollow, load bearing, conforming to ASTM Designation: C 90, lightweight or medium weight classification, Type II. Standard or open end units may be used. Open end units, if used, shall not reduce the spacing of the bar reinforcement as shown on the plans.

The masonry units shall be nominal size and texture and of uniform color. The color shall be as shown on the plans, selected from the manufacturer's standards.

When high strength concrete masonry units with $f_m=2500$ pounds per square inch are shown on the plans, the high strength masonry units shall have a minimum compressive strength of 3750 pounds per square inch based on net area. Each high strength concrete masonry unit shall be identified with a groove embedded in an interior corner. The groove shall extend from a mortar surface for a length of about 2 inches and shall have a depth of about 3/16 inch.

Expansion joint filler shall conform to ASTM Designation: D 1751 or ASTM Designation: D 2000 2AA-805.

Portland cement mortar shall be colored to match the units. Coloring shall be chemically inert, fade resistant mineral oxide or synthetic type.

Portland cement for wall stems shall conform to Section 90-2.01, "Portland Cement," of the Standard Specifications.

Hydrated lime shall conform to ASTM Designation: C 207, Type S.

Mortar sand shall be commercial quality.

Mortar for laying masonry units shall consist, by volume, of one part portland cement, 0 to 1/2 parts of hydrated lime, and 2 1/4 to 3 parts of mortar sand. Sufficient water shall be added to make a workable mortar. Each batch of mortar shall be accurately measured and thoroughly mixed. Mortar shall be freshly mixed as required. Mortar shall not be retempered more than one hour after mixing.

Prepackaged mortar materials and mortar containing admixtures may be used when approved in writing by the Engineer, provided the mortar shall not contain more than 0.05 percent soluble chlorides in accordance with California Test 422 or 0.25 percent soluble sulfates, as SO_4 , in accordance with California Test 417.

Prior to laying masonry units using prepackaged mortar materials or mortar containing admixtures, the Contractor shall submit to the Engineer the proposed sources of the materials together with test data from an independent testing laboratory for mortar tested in conformance with California Test 551. The test data shall be from specimens having a moist cure, except, the sample shall not be immersed in lime water. The average 28-day compressive strength of the mortar shall be not less than 3,750 psi.

Aggregate for grout used to fill masonry units shall consist of fine aggregate and coarse aggregate conforming to the provisions in Section 90-2.02, "Aggregates," of the Standard Specifications. At least 20 percent of the aggregate shall be coarse aggregate. The Contractor shall determine the grading except that 100 percent of the combined grading shall pass the 1/2 inch sieve.

At the option of the Contractor, grout for filling masonry units may be proportioned either by volume or weight. Grout shall contain only enough water to cause it to flow and fill the voids without segregation. The maximum amount of free water shall not exceed 0.7 times the weight of the cement for regular strength masonry. The maximum amount of free water shall not exceed 0.6 times the weight of the cement for high strength masonry.

Grout proportioned by volume for regular strength masonry shall consist of at least one part portland cement and 4.5 parts aggregate. Grout proportioned by volume for high strength masonry shall consist of at least one part portland cement and 3.5 parts aggregate. Aggregate volumes shall be based on a loose, air-dry condition.

Grout proportioned by weight for regular strength masonry shall contain at least 564 pounds of portland cement per cubic yard. Grout proportioned by weight for high strength masonry shall contain at least 658 pounds of portland cement per cubic yard.

Construction of reinforced concrete masonry unit wall stems with portland cement mortar joints shall conform to the following:

Concrete masonry unit construction shall be true and plumb in the lateral direction and shall conform to the grade shown on the plans in the longitudinal direction. Bond beam units or recesses for horizontal reinforcement shall be provided.

Cells to be filled with grout shall be provided with cleanout openings at the bottoms of each grout lift that exceeds 5 feet in height. After cell inspection, the cleanouts shall be sealed before filling with grout.

Mortar joints shall be approximately 3/8 inch wide. Walls and cross webs forming cells to be filled with grout shall be full bedded in mortar to prevent leakage of grout. All head and bed joints shall be solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shells. Head joints shall be shoved tight.

Mortared joints around cells to be filled shall be placed so as to preserve the unobstructed vertical continuity of the grout filling. Any overhanging mortar or other obstruction or debris shall be removed from the inside of such cells.

Reinforcement shall be securely held in position at top and bottom with either wire ties or spacing devices and at intervals not exceeding 192 bar diameters. Wire shall be 16-gage or heavier. Wooden, aluminum, or plastic spacing devices shall not be used.

Splices in vertical reinforcement will be allowed only where shown on the plans.

Only those cells containing reinforcement shall be filled solidly with grout. All grout in the cells shall be consolidated at the time of placement by vibrating and re-consolidated after excess moisture has been absorbed but before plasticity is lost. Slicing with a trowel is not acceptable.

If the total height of grout to be placed exceeds 6 feet the grout shall be placed in 4-foot maximum height lifts. The grout placement shall proceed in lifts until the full height of the section is placed. A minimum waiting period between placing of lifts shall be limited to the time required to obtain initial consolidation of grout, but shall be not less than 30 minutes.

A construction joint is required at the top of the top course to permit placement of the mortar cap. The mix design for the mortar cap shall be as approved by the Engineer.

Construction joints shall be made in grout when the placing of grout in grout filled cells is stopped for more than one hour. The construction joint shall be 1/2 inch below the top of the last course filled with grout.

Bond beams shall be continuous. The top of unfilled cells under horizontal bond beams shall be covered with metal or plastic lath.

When fresh masonry joins masonry that is partially or totally set, the contact surface shall be cleaned, roughened and lightly wetted.

Surface of the concrete on which the masonry walls are to be placed shall be roughened and cleaned, exposing the stone aggregate, and shall be flushed with water and allowed to dry to a surface dry condition immediately prior to laying the masonry units.

Where masonry unit cutting is necessary, all cuts shall be made with a masonry saw to neat and true lines. Masonry units with excessive cracking or chipping of the finished exposed surfaces will not be acceptable.

Masonry shall be protected as provided for concrete structures in Section 90-8, "Protecting Concrete," of the Standard Specifications and these special provisions.

During erection, all cells shall be kept dry in inclement weather by covering partially completed walls. The covering shall be waterproof fabric, plastic or paper sheeting, or other approved material. Wooden boards and planks are not acceptable as covering materials. The covering shall extend down each side of masonry walls approximately 2 feet.

Splashes, stains or spots on the exposed faces of the wall shall be removed.

Joints to existing masonry sound walls shall be constructed in accordance with the sound wall details shown on the plans or as directed by the Engineer.

ACCESS GATES.-- Access gates and metal closure/cover plates at electrical openings shall conform to the details shown on the plans and these special provisions.

Timber members shall be tongue and groove Douglas fir sub-flooring free of knotholes. The location of knots of adjoining boards shall be staggered. The construction of the gate shall be with the tongue placed in the up position. The tongue of the top board and the groove of the bottom board shall be removed.

Timber members, steel frames, channels, anchorage devices, mounting hardware, gate rollers, corrugated steel pipe, nylon washers and neoprene tubing shall be of commercial quality.

The one-inch round ladder rungs with non-skid surface shall consist of No. 8 deformed, diamond pattern, bar reinforcing steel of commercial quality.

Gate rollers shall be rigid casters with self-lubricating bearings and hard rubber wheels.

All metal parts and hardware shall be galvanized.

Timber surfaces of the access gates shall be primed and then stained with 2 coats of stain to match the adjacent sound wall. Primer and stain shall be of the top of the line primer and stain from an established manufacturer. An established manufacturer is one who has manufactured industrial paints and stains to meet custom specifications for at least 10 years.

Where the back side of the masonry wall is to be split faced, or rough surface blocks, the bond beam above the gate opening upon which the upper gate guide is to be mounted shall have smooth sided blocks.

Materials for metal closure and cover plates at openings where electroliers shall be installed shall conform to the provisions in "Miscellaneous Iron and Steel," of these special provisions, except for payment.

Portland cement concrete shall conform to the provisions in "Miscellaneous Concrete Construction," of these special provisions.

Material from excavation may be used for backfill outside of the portland cement concrete (PCC) pipe landings.

MEASUREMENT AND PAYMENT.--Sound walls and sound walls (barrier) (masonry block), will be measured by the square foot of wall projected on a vertical plane between the elevation lines shown on the plans or for walls supported on barriers from the top of the barrier to the upper elevation line and length of wall (including the exposed posts, back up wall for access openings, access gates and closure/cover plates for electrolier openings).

The contract prices paid per square foot for sound wall (barrier) (masonry block) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the sound wall complete in place, including all supports (except retaining walls, edge beams, barriers and barrier supports), anchorages, 8" diameter core drilled holes access gates, ladders, metal closure/cover plates portland cement concrete (PCC) landings, excavation, backfill, reinforcement and grade beams, and cap block as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer. Retaining walls, concrete barrier, barrier supports supporting sound walls (barrier) (masonry block) and concrete backfill will be measured and paid for as separate items of work.

10-1.52 DRILL AND BOND DOWEL (EPOXY CARTRIDGE)

Drilling and bonding dowels with epoxy cartridges shall conform to the details shown on the plans and the requirements in these special provisions.

Reinforcing steel dowels shall conform to the provisions in "Reinforcement" of these special provisions.

Threaded rods used as dowels shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications, except that galvanizing will not be required. The threaded rods shall be installed in accordance with these requirements for dowels specified herein.

The Contractor shall select an epoxy cartridge system which has passed the testing requirements of the International Conference of Building Officials (ICBO) document - AC58 and additional test requirements as specified in the Caltrans Augmentation/Revisions to ICBO AC58. Testing shall be performed by an independent testing facility and the results will be reviewed and approved by the Transportation Laboratory. The Caltrans Augmentation/Revisions to ICBO AC58 document may be obtained by contacting the Transportation Laboratory, telephone: (916) 227-7000.

The epoxy cartridge system used shall be appropriate for the ambient concrete temperature and installation conditions at the time of installation in accordance with the manufacturer's specifications.

Epoxy cartridges shall be accompanied by a Certificate of Compliance as provided in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The certificate shall state that the material complies in all respects to the specifications and data submitted in obtaining approval.

Each epoxy cartridge shall be clearly and permanently marked with the manufacturer's name, model number of the epoxy cartridge system, manufacturing date, and lot number. Each carton of epoxy cartridges shall contain the manufacturer's recommended installation procedures, minimum cure time, and such warning or precautions concerning the contents as may be required by State or Federal Laws and Regulations.

The holes shall be drilled by methods that will not shatter or damage the concrete adjacent to the holes. If reinforcement is encountered during drilling, before specified depth is attained, the Engineer shall be notified. Unless the Engineer approves, in writing, coring through the reinforcement, the hole will be rejected and a new hole, in which reinforcement is not encountered, shall be drilled adjacent to the rejected hole to the depth recommended by the manufacturer.

The drilled holes shall be cleaned in accordance with the manufacturer's instructions and shall be dry at the time of placing the epoxy cartridge bonding material and the steel dowels. The bonding material shall be a two-component epoxy system contained in a cartridge having two separate chambers and shall be inserted into the hole using a dispensing gun and replaceable mixing nozzle approved by the manufacturer. Unless otherwise specified, the depth of hole and the installation procedure shall be as recommended by the manufacturer. A copy of the manufacturer's recommended installation procedure shall be provided to the Engineer 2 days prior to the start of work.

Immediately after inserting the dowels into the epoxy, the dowels shall be supported as necessary to prevent movement during curing and shall remain undisturbed until the epoxy has cured a minimum time as specified by the manufacturer. Dowels that are improperly bonded, as determined by the Engineer, will be rejected. Adjacent new holes shall be drilled, and new dowels shall be placed and securely bonded to the concrete. All work necessary to correct improperly bonded dowels shall be performed at the Contractor's expense.

Unless otherwise provided, drilling and bonding dowels with epoxy cartridges will be measured and paid for by the unit as drill and bond dowel (epoxy cartridge). The number of units to be paid for will be determined from actual count of the completed units in place.

The contract unit price paid for drill and bond dowel (epoxy cartridge) shall include full compensation for furnishing all labor, materials (except dowels), tools, equipment and incidentals, and for doing all work involved in drilling the holes and bonding dowels with epoxy cartridges, including coring through reinforcement when approved by the Engineer, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.53 DRILL AND BOND DOWELS

Drilling and bonding dowels shall conform to the details shown on the plans, the provisions in Section 83-2.02D(1), "General," of the Standard Specifications and these special provisions.

Dowels shall conform to the provisions for bar reinforcement in "Reinforcement" elsewhere in these special provisions.

If reinforcement is encountered during drilling, before specified depth is attained, the Engineer shall be notified. Unless the Engineer approves coring through the reinforcement, the hole will be rejected and a new hole, in which reinforcement is not encountered, shall be drilled adjacent to the rejected hole to the depth shown on the plans.

Unless otherwise provided, dowels to be bonded into drilled holes will be paid for as bar reinforcing steel (bridge).

Unless otherwise provided, drilling and bonding dowels will be measured and paid for by the linear foot determined by the number and the required depth of holes as shown on the plans, or as ordered by the Engineer.

The contract price paid per linear foot for drill and bond dowel shall include full compensation for furnishing all labor, materials (except reinforcing steel dowels), tools, equipment, and incidentals, and for doing all the work involved in drilling the holes, including coring through reinforcement when approved by the Engineer, and bonding the dowels, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.54 DRILL AND PRESSURE GROUT DOWELS

Drill and pressure grouting dowels shall consist of drilling holes through concrete, placing dowels, and filling the holes with pressurized grout, as shown on the plans and in conformance with the requirements in these special provisions.

If reinforcement is encountered during drilling before the specified depth is attained, the Engineer shall be notified. Unless the Engineer approves coring through the reinforcement, the hole will be rejected and a new hole, in which reinforcement is not encountered, shall be drilled adjacent to the rejected hole to the depth shown on the plans.

Dowels placed in drilled holes shall conform to the provisions for bar reinforcement in "Reinforcement" of these special provisions.

Concrete areas and steel surfaces in contact with grout shall be cleaned of loose or foreign material that would prevent bonding, and holes shall be flushed with water and allowed to dry to a surface dry condition immediately prior to grouting.

Grout shall conform to the requirements of ASTM Designation: C 1107, Grade B, or ASTM Designation: C 845, Type K, and shall provide a minimum compressive strength of 5 ksi at 28 days when tested by California Test 551. Grout shall be mixed in accordance with the manufacturer's recommendations. Water shall conform to the provisions in Section 90-2.03, "Water," of these special provisions.

Admixtures shall not contain more than 500 parts per million of chlorides as Cl, when tested by California Test 422, and shall not contain more than 2500 parts per million of sulfates as SO₄, when tested by California Test 417.

After dowel placement, the ends of the drilled hole containing the dowel shall be sealed. A vent tube shall be placed at one end and one injection feed tube at the other end. The vent tube and injection feed tube shall be placed in the same end for drilled holes that have only one end. The tubes shall be placed in the hole in a manner which will allow air to vent and the hole to be completely filled with grout. Sufficient pressure shall be achieved to ensure that the hole is free of voids. Grout shall be pumped into the holes and continually wasted until no visible slugs or other visible evidence of water or air are ejected.

Grout or water shall not be permitted to flow into waterways, on to public traffic, across shoulders or lanes occupied by public traffic, or into gutters or other drainage facilities.

Unless otherwise provided, drilling and pressure grout dowels will be measured and paid for by the linear foot and the required depth of holes as shown on the plans.

The contract price paid per linear foot for drill and pressure grout dowels shall include full compensation for furnishing all labor, materials, dowels, tools, equipment, and incidentals, and for doing all work involved in drilling and pressure grouting the holes, including coring through reinforcement when approved by the Engineer, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.55 CORE CONCRETE

Coring concrete shall consist of coring holes through reinforced concrete bridge members as shown on the plans and in conformance with the requirements in these special provisions.

The holes shall be cored by methods that will not shatter or damage the concrete adjacent to the holes.

Water for core drilling operations shall be from the local domestic water supply or shall not contain more than 1,000 parts per million of chlorides as Cl, nor more than 1,300 parts per million of sulfates as SO₄, nor shall it contain any impurities in a sufficient amount to cause discoloration of the concrete or produce etching of the surface.

Water from core drilling operations shall not be permitted to fall on public traffic, to flow across shoulders or lanes occupied by public traffic, or to flow into gutters or other drainage facilities.

Coring concrete will be measured and paid for by the linear foot as core concrete of the sizes listed in the Engineer's Estimate. The cored concrete will be measured along the centerline of the hole without deduction for expansion joints.

Bonding reinforcement in 2" cores through abutment diaphragms at Cogswell Road Undercrossing (Widen) (Br. No. 53-0662), Durfee Avenue Undercrossing (Widen) (Br. No. 53-1031), Meeker Road Undercrossing (Widen) (Br. No. 53-1029), Lexington Avenue Undercrossing (Widen) (Br. No. 53-0883), and Tyler Avenue Undercrossing (Widen) (Br. No. 53-0659) shall conform to the provisions of "Drill and Bond Dowel" of these special provisions.

The contract price paid per linear foot for core concrete of the sizes listed in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in coring the holes, including control of water from core drilling and repairing any damaged reinforcement, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

Full compensation for bonding reinforcement in 2" cores through abutment diaphragms at Cogswell Road Undercrossing (Widen), Durfee Avenue Undercrossing (Widen) (Br. No. 53-1031), Meeker Road Undercrossing (Widen) (Br. No. 53-1029), Lexington Avenue Undercrossing (Widen) (Br. No. 53-0883), and Tyler Avenue Undercrossing (Widen) (Br. No. 53-0659) shall be considered as included in the contract price paid for core concrete (2") and no additional compensation will be allowed therefor.

10-1.56 DIAPHRAGM BOLSTER

Diaphragm bolsters shall consist of reinforced concrete blocks constructed at hinge diaphragms as shown on the plans and in conformance with the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Concrete for bolsters shall conform to the provisions in Section 90-10, "Minor Concrete," of the Standard Specifications except as follows:

1. The maximum size of aggregate used shall be at the option of the Contractor, but shall not be larger than 1 1/2 inches nor smaller than 3/8 inch.
2. If the 3/8 inch maximum size aggregate grading is used, the concrete shall contain a minimum of 658 pounds of cement per cubic yard and not more than 0.53-pounds of water per pound of cement.
3. Non-chloride Type C chemical admixtures may be used.

Holes cored in bridge decks may be filled with the same concrete used for bolsters as specified herein or with magnesium phosphate concrete conforming to the provisions in Section 83-2.02D(1), "General," of the Standard Specifications. Unless otherwise permitted in writing by the Engineer, traffic shall not be permitted on the new concrete until at least one hour after final set.

Drilling and bonding dowels shall conform to the provisions in Section 83-2.02D(1), "General," of the Standard Specifications. If reinforcement is encountered during drilling, before the specified depth is attained, the Engineer shall be notified. Unless the Engineer approves coring through the reinforcement, the hole will be rejected and a new hole, in which reinforcement is not encountered, shall be drilled adjacent to the rejected hole, at the Contractor's expense, to the depth shown on the plans.

Reinforcing bars shall be low alloy steel deformed bars conforming to the specifications of ASTM Designation: A 706.

SHOTCRETE

At the Contractor's option, shotcrete may be substituted for cast-in-place concrete at diaphragm bolsters. Shotcrete for bolsters shall conform to the provisions in Section 53, "Shotcrete," and Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Shotcrete operations shall completely encase all reinforcement and other obstructions shown on the plans. Exceptional care shall be taken to completely encase the reinforcement and other obstructions with shotcrete.

Attention is directed to "Order of Work," of these special provisions regarding furnishing preconstruction shotcrete test panels.

Shotcrete shall be applied by the wet-mix process only.

Shotcrete shall have a minimum compressive strength of 3250 pounds per square inch at 28 days or as shown on the plans, whichever is greater. No shotcrete work shall be performed prior to verification by the Engineer of the required compressive strength.

Splicing of reinforcing bars No. 7 or larger in shotcrete shall be by butt splicing only.

The Contractor shall be responsible for obtaining and testing all required preconstruction and production test cores. All coring and testing shall be at the Contractor's expense and performed in the presence of the Engineer, unless otherwise directed. The Engineer shall be notified a minimum of 24 hours prior to performing any coring or testing operations.

All cores shall be obtained and tested for compressive strength in conformance with the requirements in ASTM Designation: C 42. Cores used for determining compressive strength shall not contain bar reinforcement or other obstructions. The testing shall be performed at an independent testing facility approved by the Engineer. A copy of the test results shall be furnished to the Engineer within 5 days following completion of testing.

All test panels shall become the property of the Contractor and shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

PRECONSTRUCTION REQUIREMENTS FOR SHOTCRETE

Prior to performing shotcrete work, at least 2 preconstruction shotcrete test panels shall be constructed for each mixture being considered unless otherwise specified.

Prior to constructing any shotcrete test panels, the Contractor shall submit, in conformance with provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, the proposed method of shotcrete placement for the actual work and qualifications of the nozzleperson who will be performing the work. The nozzleperson shall have a minimum of 3000 hours experience as a nozzleperson on projects with a similar application.

Shotcrete test panels shall be constructed by the nozzleperson and application crew scheduled to do the work, using equipment, materials, mixing proportions, ambient temperatures and procedures proposed for the work. The preconstruction shotcrete test panels shall conform to the following:

One shotcrete test panel, of the size determined by the Contractor, shall be unreinforced and shall have 3 cores taken from it and tested for compressive strength. The compressive strength shall be the average strength of the 3 cores, except that, if any core should show evidence of improper coring, the core shall be discarded and the compressive strength shall be the average strength of the remaining cores. The test panel shall be identified and submitted with the test results including a description of the mixture, proportions, and ambient temperature.

One shotcrete test panel shall have the same (1) thickness, (2) bar size and amount of bar reinforcement or other obstructions and (3) positioning of bar reinforcement or obstructions as the most heavily reinforced section of shotcrete to be placed. The test panel shall be square with the length of the sides equal to at least 3 times the thickness of the most heavily reinforced section of shotcrete to be placed, but not less than 30 inches. After a minimum 7 days of cure, the test panel shall be broken by the Contractor, in the presence of the Engineer, into pieces no larger than 10 inches in greatest dimension. The surfaces of the broken pieces shall be dense and free of laminations and sand pockets, and shall verify that the bar reinforcement or other obstructions are completely encased.

Both test panels shall be cured under conditions similar to the actual work.

At the option of the Contractor, cores to be used for determining the compressive strength may be taken from the reinforced test panel described herein in lieu of making a separate unreinforced test panel as also specified herein. The compressive strength shall be the average strength of the 3 cores, except that, if any core should show evidence of improper coring or contains bar reinforcement or other obstructions, the core shall be discarded and the compressive strength shall be the average strength of the remaining cores. If cores are taken from the reinforced test panel, the panel shall not be broken into pieces, as specified herein, until the panel has cured for a minimum of 14 days.

The requirements for constructing preconstruction shotcrete test panels as specified herein may be eliminated, when approved by the Engineer, if a test panel report and certified compressive strength test data are furnished from a State highway project with a similar application of approximately equal thickness, including similar amounts and placement of reinforcement or other obstructions. The proposed nozzleperson shall have constructed the test panel described in the test panel report. The test panel report shall list the names of the application crew, equipment used, materials, mixing proportions, ambient temperatures, and procedures used to make the test panels. The certified compressive strength test data shall be for cores taken from the same test panels.

PLACING OF SHOTCRETE

An air blowpipe shall be used to remove rebound, over spray, and other debris from the areas to receive shotcrete.

Construction joints shall be tapered and shall conform to the provisions in Section 51-1.13, "Bonding," of the Standard Specifications.

All overspray and rebound shall be removed prior to final set and before placement of shotcrete on adjacent surfaces.

Rebound or any other material which has already exited the nozzle shall not be reused.

Shotcrete shall be cured in conformance with the provisions in Section 90-7.03, "Curing Structures," of the Standard Specifications.

TESTING AND ACCEPTANCE OF SHOTCRETE

At least one production shotcrete test core shall be taken from each bolster. The cores shall be 3 inches in diameter by a length equal to 1 inch less than the shotcrete thickness. The location where cores are to be taken will be designated by the Engineer. Test cores shall be identified by the Contractor and a description of the core location and mixture, including proportions, shall be submitted to the Engineer with the test cores, immediately after coring. Cored holes shall be filled with mortar in conformance with the provisions in Section 51-1.135, "Mortar," of the Standard Specifications.

Upon receipt of the cores, the Engineer will perform a visual examination to determine acceptance, as specified herein. Within 48 hours after receipt, the Engineer will return the cores to the Contractor for compressive strength testing.

The compressive strength test shall be performed using the shotcrete production test cores specified herein. The compressive strength for 3 consecutively placed bolsters shall be the average strength of the 3 cores, except that, if any core

should show evidence of improper coring, the core shall be discarded and the compressive strength shall be the average strength of the remaining cores.

The basis of acceptance for production shotcrete test cores shall be (1) that the core is dense and free of laminations and sand pockets, and shows that the reinforcement or other obstructions are completely encased and (2) the same as specified for test cylinders in the fourth and fifth paragraphs in Section 90-9.01, "General," of the Standard Specifications.

If a production test core shows signs of defective shotcrete as specified in (1) above, the shotcrete represented by the test core will be rejected, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength and quality of the shotcrete placed in the work are acceptable.

Shotcrete extending into the space shown on the plans for cast-in-place concrete shall be removed.

MEASUREMENT AND PAYMENT

Concrete bolsters will be measured and paid for by the unit as diaphragm bolster. Bolsters to be paid for will be determined from actual count of the completed units in place.

The contract unit price paid for diaphragm bolster shall include full compensation for furnishing all labor, materials (including portland cement concrete and bar reinforcement), tools, equipment, and incidentals, for doing all the work involved in constructing the diaphragm bolsters, including constructing and breaking test panels, furnishing and testing cores, patching cored holes, repair of bar reinforcing steel and filling holes in bridge decks, and drilling and bonding dowels, complete in place, as shown on the plans, and as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.57 SEALING JOINTS

Joints in concrete bridge decks and joints between concrete structures and concrete approach slabs shall be sealed in conformance with the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

When ordered by the Engineer, a joint seal larger than called for by the Movement Rating shown on the plans shall be furnished and installed. Payment to the Contractor for furnishing the larger seal and for saw cutting the increment of additional depth of groove required will be determined as provided in Section 4-1.03, "Changes," of the Standard Specifications.

The second through fourth paragraphs of Section 51-1.12F, "Sealed Joints," of the Standard Specifications are amended to read:

Type A and AL joint seals shall consist of a groove in the concrete which is filled with field mixed and placed polyurethane sealant.

Type B joint seals shall consist of a groove in the concrete which is filled with a preformed elastomeric joint seal.

Joint seal assemblies shall consist of metal or metal and elastomeric assemblies which are anchored or cast into a recess in the concrete over the joint.

The type of seal to be used for the Movement Rating (MR) shown on the plans shall be as follows:

MR	Seal Type
1/2-inch	Type A or Type B
> 1/2-inch and 2 inches	Type B
> 2 inches	joint seal assembly

State Specifications for polyurethane sealants may be obtained from the Transportation Laboratory.

The sixth paragraph of Section 51-1.12F(3) (a), "Type A and AL Seal," of the Standard Specifications is amended to read:

Polyethylene foam and rod stock shall be commercial quality, with a continuous, impervious, glazed surface, suitable for retaining the liquid sealant in the joint while hardening.

Section 51-1.12F(3)(a), "Type A and AL Seal," of the Standard Specifications is amended by adding the following paragraphs after paragraph 8:

A Certificate of Compliance, accompanied by a certified test report, shall be furnished for each batch of polyurethane sealant in accordance with the provisions in Section 6-1.07, "Certificates of Compliance."

Samples of the two components, not less than one quart each, from each batch of sealant shall be submitted to the Transportation Laboratory. In addition, samples of manufacturer required primers, not less than one quart each, shall be submitted. The samples shall be furnished for testing, with the Certificate of Compliance, 30 days in advance of proposed use.

INSTALLATION.--The fifth subparagraph of the second paragraph of Section 51-1.12F(3) (b), "Type B Seal," of the Standard Specifications is amended to read:

The seal shall be furnished full length for each joint with no more than one shop splice in any 60-foot length of seal.

One field splice per joint may be made at locations and by methods approved by the Engineer. The seals are to be manufactured full length for the intended joint, then cut at the approved splice section and rematched before splicing. The Contractor shall submit splicing details, prepared by the joint seal manufacturer, to the Engineer for approval prior to beginning splicing work.

The Contractor shall demonstrate the adequacy of the procedures to be used in the work before installing seal in the joints.

Shop splices and field splices shall have no visible offset of exterior surfaces, and shall show no evidence of bond failure.

Saw cutting of grooves will not be required at existing joints that are to be sealed with Type A joint seal unless ordered by the Engineer. The Contractor shall make saw cuts as ordered by the Engineer and the saw cutting will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

10-1.58 REFINISHING BRIDGE DECKS

Surfaces of bridge decks that are exposed when existing railings, curbs, or sidewalks are removed shall be prepared and refinished flush with the adjoining deck surface with portland cement concrete or rapid setting concrete, at the option of the Contractor, in conformance with the requirements in these special provisions.

The exact area to be refinished will be designated by the Engineer.

Attention is directed to "Public Safety" of these special provisions.

When work is being performed within 10 feet of a traffic lane or performed over traffic, dust and residue from deck preparation and cleaning shall be removed or controlled by vacuum, water spray, or shield methods approved by the Engineer.

Concrete shall be removed without damage to concrete that is to remain in place. Damage to concrete which is to remain in place shall be repaired to a condition satisfactory to the Engineer.

The concrete in deck areas to be refinished shall be removed to a depth of approximately 3/4-inch below the adjoining deck surface. A 3/4-inch deep saw cut shall be made along the perimeter of areas prior to removing concrete.

Existing areas of the deck more than 3/4-inch below the adjoining deck surface shall be prepared by removing not less than 1/4-inch of surface material to expose sound aggregates.

Concrete removal may be done by abrasive blast cutting, abrasive sawing, impact tool cutting, machine rotary abrading, or other methods, all to be approved by the Engineer. Cut areas shall be cleaned free of dust and all other loose and deleterious materials by brooming, abrasive blast cleaning and high pressure air jets. Equipment shall be fitted with suitable traps, filters, drip pans or other devices to prevent oil or other deleterious matter from being deposited on the deck.

Existing reinforcement, exposed during the removal of concrete, that is to remain in place shall be protected from damage.

Steel dowels shall be cut off flush with the existing concrete or cut off at the bottom of concrete removal, whichever is lower. Patching around or over dowels in sound concrete will not be required. Existing voids around dowels, where refinning is not required, shall be chipped back to sound concrete, the dowels removed one inch below the finished surface and the hole filled with rapid setting concrete.

Refinishing isolated high areas in the existing deck may be accomplished by cutting the concrete down to be flush with the plane of the adjoining deck surface by abrasive sawing, grinding, impact tool cutting, or other methods subject to the approval of the Engineer. When grinding is performed to bring the deck concrete flush with the adjoining deck surface, the resulting surface shall have a coefficient of friction of not less than 0.35 as determined by California Test 342.

Existing deck drains shall be filled with concrete prior to refinishing the bridge deck. The outlet of the existing drains shall be plugged to retain the concrete inside the drain pipe.

PORTLAND CEMENT CONCRETE

An epoxy adhesive shall be applied to the surfaces to be refinished before placing the portland cement concrete. Immediately prior to applying the adhesive, the area to receive the adhesive shall be cleaned by abrasive blasting and blown

clean by compressed air to remove dust and any other loose material. The area to be covered shall be surface dry and the ambient temperature shall be 50°F or above when the adhesive is applied.

The epoxy adhesive shall be furnished and applied in conformance with the provisions in Sections 95-1, "General," and 95-2.03, "Epoxy Resin Adhesive for Bonding New Concrete to Old Concrete," of the Standard Specifications. Whenever the ambient temperature is below 65°F., Type II epoxy shall be used. The exact rate of applying epoxy adhesive shall be as directed by the Engineer. The adhesive shall be worked onto the surface with stiff brushes or equal.

Portland cement concrete used to fill prepared areas shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and the following:

The concrete shall contain a minimum of 658 pounds of portland cement per cubic yard.

The amount of free water used in concrete shall not exceed 280 pounds per cubic yard.

The aggregate shall contain between 50 and 55 percent fine aggregate and the remainder shall be pea gravel. The grading of pea gravel shall be such that 100 percent passes the 1/2 inch screen and not more than 5 percent passes the No. 16 sieve, unless a larger size is ordered by the Engineer.

Admixtures shall be furnished and used if directed by the Engineer.

Immediately after depositing on the newly placed adhesive, the portland cement concrete shall be thoroughly consolidated until all voids are filled and free mortar appears on the surface and then struck off to the required grade.

Concrete shall be cured as provided in Section 90-7.03, "Curing Structures," of the Standard Specifications.

No loads of any kind shall be applied to the portland cement concrete for at least 7 days after placing, unless otherwise permitted by the Engineer.

RAPID SETTING CONCRETE

The concrete used to fill the prepared areas shall be a high-strength material consisting of either magnesium phosphate concrete, modified high alumina based concrete, or portland cement based concrete. Magnesium phosphate concrete shall conform to the requirements for magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications and these special provisions. Modified high alumina based concrete and portland cement based concrete shall be water activated and shall conform to the requirements for single component (water activated) magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications and the following:

A clean uniform rounded aggregate filler may be used to extend the concrete. The moisture content of the aggregate shall not exceed 0.5 percent. Grading of the aggregate shall conform to the following:

Sieve Size	Percentage Passing
1/2 "	100
No. 16	0-5

The amount of aggregate filler shall conform to the manufacturer's recommendation, but in no case shall the concrete strengths be less than that specified for magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications.

Mixing of components of dual component (with a prepackaged liquid activator) magnesium phosphate shall be by complete units, supplied by the manufacturer. Portions of units shall not be used. Water shall not be added to dual component magnesium phosphate.

Immediately prior to applying the rapid setting concrete, the surface shall be dry and blown clean by compressed air to remove accumulated dust and any other loose material. If the surface becomes contaminated at any time prior to placing the concrete, the surface shall be cleaned by abrasive blasting. The surface temperature of the areas to be covered shall be 40°F or above when the concrete is applied. Methods proposed to heat said surfaces are subject to approval by the Engineer. The surface for the magnesium phosphate concrete shall be dry. The surfaces for modified high alumina based concrete or portland cement based concrete may be damp but not saturated.

Magnesium phosphate concrete shall not be mixed in containers or worked with tools containing zinc, cadmium, aluminum or copper. Modified high alumina based concrete shall not be mixed in containers or worked with tools containing aluminum.

Retempering concrete will not be permitted. Finishing tools that are cleaned with water shall be thoroughly dried before working the concrete.

When placing concrete on slopes exceeding 5 percent, the Engineer may require the Contractor to provide a flow controlled modified material.

Modified high alumina based concrete and portland cement based concrete shall be cured in conformance with the provisions in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications. Magnesium phosphate concrete shall not be cured.

Unless otherwise permitted in writing by the Engineer, traffic shall not be permitted on the new concrete until at least 24 hours after final set.

FINISHING REQUIREMENTS

In advance of curing operations, the surface of the concrete shall be textured by brooming with a stiff bristled broom or by other suitable devices which will result in uniform scoring. Brooming shall be performed transversely. The operation shall be performed at a time and in a manner to produce a hardened surface having a uniform texture and a coefficient of friction of not less than 0.35 as determined by California Test 342.

Refinished surfaces that are found to have a coefficient of friction less than 0.35 shall be ground or grooved by the Contractor at his expense in conformance with the applicable requirements in Section 42, "Groove and Grind Pavement," of the Standard Specifications.

In the longitudinal direction, refinished surfaces shall not vary more than 0.02-foot from the lower edge of a 12-foot straightedge. The refinished surface shall be flush with the existing adjoining surface.

MEASUREMENT AND PAYMENT

No adjustment of compensation will be made for any increase or decrease in the quantity of refinish bridge deck, regardless of the reason for such increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications shall not apply to the contract item of refinish bridge deck.

The quantity in square feet of refinish bridge deck to be paid for will be determined from the lengths and widths of the refinished areas, measured horizontally, plus 0.2-square foot for patching around each dowel.

The contract price paid per square foot for refinish bridge deck shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in refinishing areas of the existing bridge deck (including cutting steel dowels), complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for removing and disposing of existing deck drain grates and filling existing bridge deck drains with concrete, as shown on the plans, shall be considered as included in the contract price paid per square foot for refinish bridge deck and no separate payment will be made therefor.

10-1.59 REINFORCEMENT

Reinforcement shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

The first paragraph of Section 52-1.02A, "Bar Reinforcement," of the Standard Specifications is amended to read:

52-1.02A Bar Reinforcement.—Reinforcing bars shall be low-alloy steel deformed bars conforming to the requirements in ASTM Designation: A 706/A 706M, except that deformed or plain billet-steel bars conforming to the requirements in ASTM Designation: A 615/A 615M, Grade 40 or 60, may be used as reinforcement in the following:

1. Slope and channel paving;
2. Minor structures;
3. Sign and signal foundations (pile and spread footing types);
4. Roadside rest facilities; and
5. Concrete barrier Type 50 and Type 60 series and temporary railing.

Deformations specified in ASTM Designation: A 706/A 706M will not be required on bars used as spiral or hoop reinforcement in structures and concrete piles.

Section 52-1.02C, "Welded Wire Fabric," of the Standard Specifications is amended to read:

52-1.02C Welded Wire Fabric.—Welded wire fabric shall be either plain or deformed conforming to the requirements in ASTM Designation: A 185 or ASTM Designation: A 497, respectively.

Section 52-1.02D, "Reinforcing Wires and Plain Bars," of the Standard Specifications is amended to read:

52-1.02D Reinforcing Wire.—Wire used as reinforcement in structures and concrete piles, as shown on the plans, shall be cold drawn steel wire conforming to the specifications of ASTM Designation: A 82.

The third paragraph of Section 52-1.04, "Inspection," of the Standard Specifications is amended to read:

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall also be furnished for each shipment of epoxy-coated bar reinforcement or wire reinforcement certifying that the coated reinforcement conforms to the requirements in ASTM Designation: A 775/A 775M or A 884/A 884M, respectively, and the provisions in Section 52-1.02B, "Epoxy-coated Bar Reinforcement," of the Standard Specifications. The Certificate of Compliance shall include all the certifications specified in ASTM Designation: A 775/A 775M or A 884/A 884M, respectively, and a statement that the coating material has been prequalified by acceptance testing performed by the Valley Forge Laboratories, Inc., Devon, Pennsylvania.

The last paragraph of Section 52-1.07, "Placing," of the Standard Specifications is amended to read:

Attention is directed to the provisions in Section 7-1.09, "Public Safety." Whenever a portion of an assemblage of bar reinforcing steel that is not encased in concrete exceeds 20 feet in height, the Contractor shall submit to the Engineer for approval, in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings," working drawings and design calculations for the temporary support system to be used. The working drawings and design calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California. The temporary support system shall be designed to resist all expected loads and shall be adequate to prevent collapse or overturning of the assemblage. If the installation of forms or other work requires revisions to or temporary release of any portion of the temporary support system, the working drawings shall show the support system to be used during each phase of construction. The minimum horizontal wind load to be applied to the bar reinforcing steel assemblage, or to a combined assemblage of reinforcing steel and forms, shall be not less than 20 pounds per square foot on the gross projected area of the assemblage.

The sixth paragraph of Section 52-1.08, "Splicing," of the Standard Specifications is amended to read:

Except when otherwise specified, mechanical lap splicing shall conform to the details shown on the plans, the requirements for mechanical butt splices as specified in this Section 52-1.08, and Sections 52-1.08C, "Mechanical Butt Splices," 52-1.08D, "Qualification of Welding and Mechanical Splicing," and 52-1.08E, "Job Control Tests," and the following:

The mechanical lap splice shall be a unit consisting of a sleeve, in which the reinforcing bars are positioned, and a wedge driven through holes in the sleeve and between the reinforcing bars. The mechanical lap splice shall only be used for splicing non-epoxy-coated deformed reinforcing bars Nos. 4, 5 and 6.

The eighth and ninth paragraphs of Section 52-1.08, "Splicing," of the Standard Specifications are amended to read:

Unless otherwise shown on the plans or approved by the Engineer, splices in adjacent reinforcing bars at any particular section shall be staggered. The minimum distance between staggered lap splices or mechanical lap splices shall be the same length required for a lapped splice in the largest bar. The minimum distance between staggered butt splices shall be 2 feet. Distances shall be measured between the midpoints of the splices along a line which is centered between the axes of the adjacent bars.

Completed butt splices shall develop a minimum tensile strength, based on the nominal bar area, of 63,000 psi for ASTM Designation: A 615/A 615M Grade 40 bars, and of 80,000 psi for ASTM Designation: A 615/A 615M Grade 60 and ASTM Designation: A 706/A 706M bars. If butt splices are made between two bars of dissimilar strengths, the minimum required tensile strength for the splice shall be that required for the weaker bar.

The second sentence of the eleventh paragraph of Section 52-1.08, "Splicing," of the Standard Specifications is amended to read:

Job control tests shall be made on sample splices representing each lot of mechanical butt splices as provided in Section 52-1.08E, "Job Control Tests."

Section 52-1.08B, "Butt Welded Splices," of the Standard Specifications is amended to read:

52-1.08B Butt Welded Splices.— Butt welded splices in reinforcing bars shall be complete joint penetration butt welds conforming to the requirements in AWS D1.4, and the requirements of these specifications and the special provisions. At the option of the Contractor, shop produced resistance butt welds, that are produced by a fabricator who is approved by the Transportation Laboratory, may be used. These welds shall conform to the requirements of these specifications and the special provisions

Only the joint details and dimensions as shown in Figure 3.2, "Direct Butt Joints," of AWS D 1.4-92, shall be used for making complete joint penetration butt welds of bar reinforcement. Split pipe backing shall not be used.

Material used as backing for complete joint penetration butt welds of bar reinforcement shall be a flat plate conforming to the requirements of ASTM Designation: A 709/A 709M, Grade 36[250]. The flat plate shall be 0.25-inch thick with a width, as measured perpendicular to the axis of the bar, equal to the nominal diameter of the bar, and a length which does not exceed twice the nominal diameter of the bar. The flat plate backing shall be fitted tightly to the bar with the root of the weld centered on the plate. Any bar deformation or obstruction preventing a tight fit shall be ground smooth and flush with the adjacent surface. Tack welds used to fit backing plates shall be within the weld root area so that they are completely consumed by the finished weld. Backing plates shall not be removed.

Butt welds shall be made with multiple weld passes using a stringer bead without an appreciable weaving motion. The maximum stringer bead width shall be 2.5 times the diameter of the electrode and slagging shall be performed between each weld pass. Weld reinforcement shall not exceed 1/8-inch in convexity.

Before any electrodes or flux-electrode combinations are used, the Contractor, at the Contractor's expense, shall furnish certified copies of test reports for all the pertinent tests specified in AWS A5.1, AWS A5.5, AWS A5.18 or AWS A5.20, whichever is applicable, made on electrodes or flux-electrode combinations of the same class, brand and nearest specified size as the electrodes to be used. The tests may have been made for process qualification or quality control, and shall have been made within one year prior to manufacture of the electrodes and fluxes to be used. The report shall include the manufacturer's certification that the process and material requirements were the same for manufacturing the tested electrodes and the electrodes to be used. The forms and certificates shall be as directed by the Engineer.

Electrodes for manual shielded metal arc welding of ASTM Designation: A 615/A 615M, Grade 60 bars shall conform to the requirements of AWS A5.5 for E9018-M or E10018-M electrodes.

Electrodes for manual shielded metal arc welding of ASTM Designation: A 706/A 706M bars shall conform to the requirements of AWS A5.5 for E8016-C3 or E8018-C3 electrodes.

Solid and composite electrodes for semiautomatic gas metal-arc and flux-cored arc welding of Grade 40 reinforcing bars shall conform to the requirements of AWS A5.18 for ER70S-2, ER70S-3, ER70S-6 or ER70S-7 electrodes; or AWS A5.20 for E70T-1, E70T-5, E70T-6 or E70T-8 electrodes.

Electrodes for semiautomatic welding of ASTM Designation: A 615/A 615M, Grade 60 and ASTM Designation: A 706/A 706M bars shall produce a weld metal deposit with properties conforming to the requirements of Section 5.3.4 of AWS D1.1-96 for ER80S-Ni1, ER80S-Ni2, ER80S-Ni3, ER80S-D2, E90T1-K2 and E91T1-K2 electrodes.

Reinforcing bars shall be preheated for a distance of not less than 6 inches on each side of the joint prior to welding.

For all welding of ASTM Designation: A 615/A 615M, Grade 40 or Grade 60 bars, the requirements of Table 5.2, "Minimum Preheat and Interpass Temperatures," of AWS D1.4-92 are superseded by the following:

The minimum preheat and interpass temperatures shall be 400° F. for Grade 40 bars and 600° F. for Grade 60 bars. Immediately after completing the welding, at least 6 inches of the bar on each side of the splice shall be covered by an insulated wrapping to control the rate of cooling. The insulated wrapping shall remain in place until the bar has cooled below 200° F.

When welding different grades of reinforcing bars, the electrode shall conform to Grade 40 bar requirements and the preheat shall conform to the Grade 60 bar requirements.

In the event that any of the specified preheat, interpass and post weld cooling temperatures are not met, all weld and heat affected zone metal shall be removed and the splice rewelded.

Welding shall be protected from air currents, drafts, and precipitation to prevent loss of heat or loss of arc shielding. The method of protecting the welding area from loss of heat or loss of arc shielding shall be subject to approval by the Engineer.

Reinforcing bars shall not be direct butt spliced by thermite welding.

The first paragraph of Section 52-1.08C, "Mechanical Butt Splices," of the Standard Specifications is amended to read:

52-1.08C Mechanical Butt Splices.—Mechanical butt splices shall be the sleeve-filler metal type, the sleeve-threaded type, the sleeve-swaged type, the sleeve-filler grout type, the sleeve-lockshear bolt type, the two-part sleeve-forged bar type, or the two-part sleeve-friction bar type, at the option of the Contractor.

The third paragraph of Section 52-1.08C, "Mechanical Butt Splices," of the Standard Specifications is amended to read:

The total slip of the reinforcing bars within the splice sleeve after loading in tension to 29 ksi and relaxing to 2.9 ksi shall not exceed the values listed in the following table. The slip shall be measured between gage points that are clear of the splice sleeve.

Reinforcing Bar Number	Total Slip (mil)
4	9.84
5	9.84
6	9.84
7	13.78
8	13.78
9	13.78
10	17.72
11	17.72
14	23.62
18	29.53

The following is added after the third paragraph of Section 52-1.08C, "Mechanical Butt Splices," of the Standard Specifications:

Slip requirements shall not apply to mechanical lap splices.

The following is added after Section 52-1.08C(3), "Sleeve-Swaged Mechanical Butt Splices," of the Standard Specifications:

52-1.08C(4) Sleeve-Filler Grout Mechanical Butt Splices.—The sleeve-filler grout type of mechanical butt splices shall consist of a steel splice sleeve that fits closely over the reinforcing bars with a non-shrink grout filler in the annular space between the reinforcing bars and the sleeve and between the ends of the reinforcing bars.

No vibration or movement of the reinforcing steel or sleeve at the splice shall be allowed while the splice is developing sufficient strength to support the reinforcing bars. The Contractor shall submit complete details of the bracing and clamping system to eliminate all vibration or movement at the splice during setup of the filler in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings."

52-1.08C(5) Sleeve-Lockshear Bolt Mechanical Butt Splices.— The sleeve-lockshear bolt type of mechanical butt splices shall consist of a seamless steel sleeve, center hole with centering pin, and bolts that are tightened until the bolt heads shear off with the bolt ends left embedded in the reinforcing bars. The seamless steel sleeve shall be either formed into a V configuration or shall have 2 serrated steel strips welded to the inside of the sleeve.

52-1.08C(6) Two-Part Sleeve-Forged Bar Mechanical Butt Splices.— The two-part sleeve-forged bar type of mechanical butt splices shall consist of a shop machined two-part threaded steel sleeve that interlocks two hot-forged reinforcing bars ends. The forged bar ends may be either shop produced or field produced.

52-1.08C(7) Two-Part Sleeve-Friction Bar Mechanical Butt Splices.— The two-part sleeve-friction bar type of mechanical butt splices shall consist of a shop machined two-part threaded steel sleeve whose ends are friction welded, in the shop, to the reinforcing bars ends.

The third paragraph of Section 52-1.08D, "Qualification of Welding and Mechanical Splicing," of the Standard Specifications is amended to read:

Resistance butt welds shall be produced by a fabricator approved by the Transportation Laboratory.

Each operator qualification test for mechanical splices shall consist of 2 sample splices. Each mechanical splice procedure test shall consist of 2 sample splices.

For sleeve-filler, sleeve-threaded, sleeve-lockshear bolt and two-part sleeve friction bar mechanical butt splices, all sample splices shall be made on the largest reinforcing bar size to be spliced by the procedure or operator being tested except that No. 14 bars may be substituted for No. 18 bars.

For sleeve-swaged and two-part sleeve-forged mechanical butt splices, and mechanical lap splices, all sample splices shall be made on the largest reinforcing bar size of each deformation pattern to be spliced by the procedure or operator being tested. When joining new reinforcing bars to existing reinforcement, the qualification test sample bars shall be made with the deformation pattern of the new reinforcement to be joined.

Section 52-1.08E, "Job Control Tests," of the Standard Specifications is amended to read:

52-1.08E Job Control Tests.—When mechanical butt splices, shop produced complete joint penetration butt welded splices, or shop produced resistance butt welded splices are used, the Contractor shall furnish job control tests from a local qualified testing laboratory. A job control test shall consist of the fabrication, under conditions used to produce the splice, and the physical testing of 3 sample splices for each lot of 150 splices.

A lot of mechanical butt splices is defined as 150, or fraction thereof, of the same type of mechanical butt splices used for each combination of bar size and bar deformation pattern that is used in the work.

A lot of shop produced complete joint penetration butt welded splices, or shop produced resistance butt welded splices, is defined as 150, or fraction thereof, of the same type of welds used for each combination of bar size and bar deformation pattern that is used in the work.

When joining new reinforcing bars to existing reinforcement, the job control test shall be made using only the deformation patterns of the new reinforcement to be joined.

A sample splice shall consist of a splice made at the job site to connect two 30-inch, or longer, bars using the same splice materials, position, location, and equipment, and following the same procedures as are being used to make splices in the work. Shorter sample splice bars may be used if approved by the Engineer.

Sample splices shall be made and tested in the presence of the Engineer or the Engineer's authorized representative.

Sample splices shall be suitably identified with weatherproof markings prior to shipment to the testing laboratory.

For sleeve-threaded mechanical butt splices, the reinforcing bars to be used for job control tests shall be fabricated on a random basis during the cutting of threads on the reinforcing bars of each lot and shipped to the job site with the material they represent.

For shop produced complete joint penetration butt welds, shop produced resistance butt welded splices and all types of mechanical butt splices, except the sleeve-threaded type, the Engineer will designate when samples for job control tests are to be fabricated, and will determine the limits of the lot represented by each job control test.

Should the average of the results of tests made on the 3 sample splices or should more than one sample splice in any job control test fail to meet the requirements for splices, all splices represented by that test will be rejected in accordance with the provisions in Section 6-1.04, "Defective Materials," of the Standard Specifications. This rejection shall prevail unless the Contractor, at the Contractor's expense, obtains and submits evidence, of a type acceptable to the Engineer, that the strength and quality of the splices in the work are acceptable.

Section 52-1.08F, "Nondestructive Splice Tests" of the Standard Specifications is amended to read:

52-1.08F Nondestructive Splice Tests.—All required radiographic examinations of complete joint penetration butt welded splices shall be performed by the Contractor in accordance with the requirements of AWS D 1.4 and these specifications.

Prior to radiographic examination, welds shall meet the requirements of Section 4.4, "Quality of Welds," of AWS D1.4-92.

Radiographic examinations shall be performed on 25 percent of all complete joint penetration butt welded splices from a production lot. The size of a production lot will be a maximum of 100 splices. The Engineer will select the splices which will compose the production lot and also the splices within each production lot to be radiographically examined.

Should more than 12 percent of the splices which have been radiographically examined in any production lot be defective, an additional 25 percent of the splices, selected by the Engineer from the same production lot, shall be radiographically examined. Should more than 12 percent of the cumulative total of splices tested from the same production lot be defective, all remaining splices in the lot shall be radiographically examined.

Additional radiographic examinations performed due to the identification of defective splices shall be at the Contractor's expense.

All defects shall be repaired in accordance with the requirements of AWS D1.4.

In addition to radiographic examinations performed by the Contractor, any mechanical or welded splice may be subject to inspection or nondestructive testing by the Engineer. The Contractor shall provide sufficient access facilities in the shop and at the jobsite to permit the Engineer or his agent to perform the inspection or testing.

The Contractor shall notify the Engineer in writing 48 hours prior to performing any radiographic examinations.

The radiographic procedure used shall conform to the requirements of ASME Boiler and Pressure Vessels Code, Section V, Article 2 and the following:

Two exposures shall be made for each complete joint penetration butt welded splice. For each of the two exposures, the radiation source shall be centered on each bar to be radiographed. The first exposure shall be made with the radiation source placed at zero degrees from the top of the weld and perpendicular to the weld root and identified with a station mark of "0." When obstructions prevent a zero degree placement of the radiation source for the first exposure, and when approved in writing by the Engineer, the source may be rotated, around the centerline

of the reinforcing bar, a maximum of 25 degrees. The second exposure shall be at 90 degrees to the "0" station mark and shall be identified with a station mark of "90."

For field produced complete joint penetration butt welds, no more than one weld shall be radiographed during one exposure. For shop produced complete joint penetration butt welds, if more than one weld is to be radiographed during one exposure, the angle between the root line of each weld and the direction to the radiation source shall be not less than 65 degrees.

Radiographs shall be made by either X-ray or gamma ray. Radiographs made by X-ray or gamma rays shall have densities of not less than 2.3 nor more than 3.5 in the area of interest. A tolerance of 0.05 in density is allowed for densitometer variations. Gamma rays shall be from the iridium 192 isotope and the emitting specimen shall not exceed 0.175-inch in the greatest diagonal dimension.

The radiographic film shall be placed perpendicular to the radiation source at all times; parallel to the root line of the weld unless source placement determines that the film must be turned; and as close to the root of the weld as possible.

The minimum source to film distance shall be maintained so as to insure that all radiographs maintain a maximum geometric unsharpness of 0.020 at all times, regardless of the size of the reinforcing bars.

Penetrameters shall be placed on the source side of the bar and perpendicular to the radiation source at all times. One penetrometer shall be placed in the center of each bar to be radiographed, perpendicular to the weld root, and adjacent to the weld. Penetrometer images shall not appear in the weld area.

When radiography of more than one weld is being performed per exposure, each exposure shall have a minimum of one penetrometer per bar, or 3 penetrameters per exposure. When 3 penetrameters per exposure are used, one penetrometer shall be placed on each of the 2 outermost bars of the exposure, and the remaining penetrometer shall be placed on a centrally located bar.

An allowable weld buildup of 1/8 inch may be added to the total material thickness when determining the proper penetrometer selection. No image quality indicator equivalency will be accepted. Wire penetrameters or penetrometer blocks shall not be used.

Penetrameters shall be sufficiently shimmed using a radiographically identical material. Penetrometer image densities shall be a minimum of 2.0 and a maximum of 3.6.

All radiographic film shall be Class 1, regardless of the size of reinforcing bars.

Radiographs shall be free of film artifacts and processing defects, including, but not limited to, streaks, scratches, pressure marks, or marks made for the purpose of identifying film or welding indications.

Each splice shall be clearly identified on each radiograph and the radiograph identification and marking system shall be established between the Contractor and the Engineer before radiographic inspection begins. Film shall be identified by lead numbers only; etching, flashing, or writing in identifications of any type will not be permitted. Each piece of film identification information shall be legible and shall include, as a minimum, the following information: Contractor's name, date, name of nondestructive testing firm, initials of radiographer, contract number, part number, and weld number. The letter "R" and repair number shall be placed directly after the weld number to designate a radiograph of a repaired weld.

Radiographic film shall be developed within a time range of one minute less to one minute more than the film manufacturer's recommended maximum development time. Sight development will not be allowed.

Processing chemistry shall be done with a consistent mixture and quality, and processing rinses and tanks shall be clean to ensure proper results. Records of all developing processes and any chemical changes to the developing processes shall be kept and furnished to the Engineer upon request. The Engineer may request, at any time, that a sheet of unexposed film be processed in the presence of the Engineer to verify processing chemical and rinse quality.

The results of all radiographic interpretations shall be recorded on a signed certification and a copy kept with the film packet.

Technique sheets prepared in accordance with ASME Boiler and Pressure Vessels Code, Section V, Article 2 Section T-291 shall also contain the developer temperature, developing time, fixing duration and all rinse times.

Individual hoops, made continuous with butt welded splices, which are substituted for spiral reinforcement, shall conform to the requirements for "Ultimate Butt Splices" of these special provisions.

ULTIMATE BUTT SPLICES.--Ultimate butt splices shall be either welded or mechanical splices, shall be used at the locations shown on the plans, and shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

GENERAL REQUIREMENTS.-- The Contractor shall designate in writing an ultimate butt splicing Quality Control Manager (QCM). The QCM shall be responsible directly to the Contractor for 1) the quality of all ultimate butt splicing including the inspection of materials and workmanship performed by the Contractor and all subcontractors; and 2) submitting, receiving, and approving all correspondence, required submittals, and reports regarding ultimate butt splicing to and from the Engineer.

The QCM shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors, who will provide other services or materials for the project. The QCM may be an employee of the Contractor.

The length of any type of ultimate mechanical butt splice shall not exceed 10 times the bar diameter of the larger bar to be spliced.

All ultimate prejob, production, and job control sample splices shall be 1) a minimum length of 5 feet for reinforcing bars No. 8 or smaller and 7 feet for reinforcing bars No. 9 or larger, with the splice located at mid-point, and 2) suitably identified prior to shipment with weatherproof markings that do not interfere with the Engineer's tamper-proof markings or seals. Any splice that shows signs of tampering will be rejected.

A minimum of one control bar shall be removed from the same bar as, and adjacent to, all ultimate prejob, production, and job control sample splices. Control bars shall be 1) a minimum length of 3 feet for reinforcing bars No. 8 or smaller and 5 feet for reinforcing bars No. 9 or larger, and 2) suitably identified prior to shipment with weatherproof markings that do not interfere with the Engineer's tamper-proof markings or seals. The portion of adjacent bar remaining in the work shall also be identified with weatherproof markings that correspond to its adjacent control bar.

Shorter length sample splice and control bars may be furnished if approved in writing by the Engineer.

Each sample splice and its associated control bar shall be identified and marked as a set. Each set shall be identified as representing a prejob, production, or job control sample splice.

The portion of hoop reinforcing bar, removed to obtain a sample splice and control bar, shall be replaced using a prequalified ultimate mechanical butt splice, or the hoop shall be replaced in kind.

Reinforcing bars, other than hoops, from which sample splices are removed, shall be repaired using ultimate mechanical butt splices conforming to the provisions in "Prejob Test Requirements for Ultimate Butt Splices" specified herein, or the bars shall be replaced in kind. These bars shall be repaired or replaced such that no splices are located in the "No Splice Zone" shown on the plans.

Section 52-1.08E, "Job Control Tests," of the Standard Specifications shall not apply.

The provisions for total slip shall not apply to any ultimate splices that are welded or that are used on hoops.

The independent qualified testing laboratory used to perform the testing of all ultimate butt sample splices and control bars shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors who will provide other services or materials for the project, and shall have the following:

Proper facilities, including a tensile testing machine capable of breaking the largest size of reinforcing bar to be tested.

A device for measuring the total slip of the reinforcing bars across the splice to the nearest one (1) mil, that, when placed parallel to the longitudinal axis of the bar is able to simultaneously measure movement across the splice, at 2 locations, 180 degrees apart.

Operators who have received formal training for performing the testing requirements of ASTM Designation: A 370/A 370M and California Test 670.

A record of annual calibration of testing equipment performed by an independent third party that has 1) standards that are traceable to the National Institute of Standards and Technology, and 2) a formal reporting procedure, including published test forms.

ULTIMATE BUTT SPLICE TEST CRITERIA.-- Ultimate prejob, production, and job control sample splices shall be tensile tested in conformance with the requirements described in ASTM Designation: A 370/A 370M and California Test 670.

Ultimate prejob and production sample splices shall rupture in the reinforcing bar either: 1) outside of the affected zone or 2) within the affected zone, provided that the sample has achieved at least 95 percent of the ultimate tensile strength of the control bar associated with the sample. In addition, necking of the bar shall be visibly evident at rupture regardless of whether the bar breaks inside or outside the affected zone.

The affected zone is the portion of the reinforcing bar where any properties of the bar, including the physical, metallurgical, or material characteristics, have been altered by fabrication or installation of the splice.

The ultimate tensile strength of each control bar shall be determined by tensile testing the bar to rupture and shall be determined for all control bars, regardless of where each sample splice ruptures. If 2 control bars are tested for one sample splice, the bar with the lower ultimate tensile strength shall be considered the control bar.

Testing to determine the minimum tensile strength, in conformance with the provisions in the ninth paragraph of Section 52-1.08, "Splicing," of the Standard Specifications, will not be required.

PREJOB TEST REQUIREMENTS FOR ULTIMATE BUTT SPLICES.--Prior to use in the work, all welded and mechanical ultimate butt splices shall conform to the following prejob test requirements:

Eight prejob sample splices for each bar size of each splice type including ultimate mechanical butt splices, ultimate complete joint penetration butt welded splices, and ultimate resistance butt welded splices, that will be used in the work, shall be fabricated by the Contractor. For deformation-dependent types of couplers, 8 sample prejob splices shall also be fabricated for each reinforcing bar size and deformation pattern that will be used in the work.

The sample splices shall be fabricated using the same splice materials, position, operators, location, and equipment, and following the same procedures as will be used to make the splices in the work.

At the option of the Contractor, operator qualification tests may be performed simultaneously with the preparation of prejob sample splices.

If different diameters of hoops are shown on the plans, prejob sample splices, as described above, will only be required for the smallest hoop diameter. In addition, these splices shall be fabricated using the same radius as shown on the plans for these hoops.

Unless otherwise directed in writing by the Engineer, 4 prejob sample splices and control bar sets shall be shipped to the Transportation Laboratory and the remaining 4 sets shall be tested by the Contractor's independent qualified testing laboratory.

Each group of 4 sets from a prejob test shall be securely bundled together and identified by location and contract number with weatherproof markings prior to shipment. Bundles containing fewer than 4 sets will not be tested by the Transportation Laboratory, nor shall they be tested by the independent laboratory.

All 8 sample splices from each prejob test shall conform to the provisions in "Ultimate Butt Splice Test Criteria" specified herein.

Prior to performing any tensile tests on prejob test sample splices, one of the 4 samples shall be tested for, and shall conform to, the provisions for total slip. Should this sample not meet these requirements, one retest, in which the 3 remaining samples are tested for total slip, will be allowed. All 3 of these remaining samples tested shall conform to the aforementioned slip requirements.

For each bundle of 4 sets, a Prejob Test Report shall be prepared by the independent testing laboratory performing the testing. The report shall 1) be signed by an engineer who represents the laboratory and is registered as a Civil Engineer in the State of California; 2) include, as a minimum, the following information for each set: contract number, bridge number, bar size, type of splice, length of mechanical splice, physical condition of test sample splice and control bar, any notable defects, limits of affected zone, total measured slip, location of visible necking area, ultimate strength of each splice, ultimate strength and 95 percent of this ultimate strength for each control bar, and a comparison between 95 percent of the ultimate strength of each control bar and the ultimate strength of its associated splice; and 3) be submitted to the QCM for review and approval, and then to the Engineer.

Test results for each bundle of 4 sets will be reported in writing to the Contractor within 10 working days after receipt of the bundle by the Transportation Laboratory. In the event that more than one bundle is received on the same day, 2 additional working days shall be allowed for providing test results for each additional bundle received. A test report will be made for each bundle received.

Should the Engineer fail to provide the test results within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in providing the test results, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

PRODUCTION TEST REQUIREMENTS FOR ULTIMATE BUTT SPLICES.--Production tests shall be performed for all ultimate butt splices used in the work. A production test shall consist of 4 sets of sample splices and control bars removed from each lot of completed splices, except when quality assurance tests are performed.

A lot of ultimate butt splices is defined as 1) 150, or fraction thereof, of the same type of ultimate mechanical butt splices used for each bar size and each bar deformation pattern that is used in the work or 2) 150, or fraction thereof, of ultimate complete joint penetration butt welded splices, or ultimate resistance butt welded splices for each bar size used in the work. If different diameters of hoop reinforcement are shown on the plans, separate lots shall be used for each different hoop diameter.

After all splices in a lot have been completed and the bars have been epoxy-coated, the QCM shall notify the Engineer in writing that all couplers in this lot conform to the specifications and are ready for testing. The sample splices will either be selected by the Engineer at the job site or a fabrication facility, provided the facility is located within an 50 mile radius of the jobsite.

At the option of the Contractor, sample splices for spiral reinforcement may be either 1) removed from the completed lot, or 2) prepared in the same manner as specified herein for ultimate prejob sample splices and control bars.

After notification has been received, the Engineer will randomly select the 4 sample splices to be removed from the lot and place tamper-proof markings or seals on them. The Contractor or QCM shall select the adjacent control bar for each sample splice bar, and the Engineer will place tamper-proof markings or seals on them. These ultimate production sample splices and control bars shall be removed by the Contractor, and tested by an independent qualified testing laboratory, in the presence of either the Engineer or the Engineer's authorized representative.

The Engineer or the Engineer's authorized representative will be at the independent qualified testing laboratory within a maximum of 5 working days after receiving written notification that the samples are at the laboratory and ready for testing. Should the Engineer or the Engineer's authorized representative fail to be at the laboratory within this time allowance, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of this action, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

A sample splice or control bar from any set will be rejected if any tamper-proof marking or seal is disturbed prior to testing.

The 4 sets from each production test shall be securely bundled together and identified with a completed sample identification card prior to shipment to the independent laboratory. The card will be furnished by the Engineer. Bundles of samples containing fewer than 4 sets of splices shall not be tested.

A Production Test Report for all testing performed on each lot shall be prepared by the independent testing laboratory performing the testing and submitted to the QCM for review and approval. The report shall be signed by an engineer who represents the laboratory and is registered as a Civil Engineer in the State of California. The report shall include, as a minimum, the following information for each set: contract number, bridge number, lot number and location, bar size, type of splice, length of mechanical splice, physical condition of test sample splice and control bar, any notable defects, limits of affected zone, total measured slip, location of visible necking area, ultimate strength of each splice, ultimate strength and 95 percent of this ultimate strength for each control bar, and a comparison between 95 percent of the ultimate strength of each control bar and the ultimate strength of its associated splice.

The QCM must review, approve, and forward each Production Test Report to the Engineer for review before any splices represented by the report are encased in concrete. The Engineer shall have 3 working days to review each Production Test Report and respond in writing after a complete report has been received. Should the Contractor elect to encase any splices prior to receiving notification from the Engineer, it is expressly understood that the Contractor will not be relieved of the Contractor's responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Any material not conforming to these requirements will be subject to rejection. Should the Contractor elect to wait to encase any splices pending notification by the Engineer, and should the Engineer fail to complete the review and provide notification within this time allowance, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in notification, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

Prior to performing any tensile tests on production test sample splices, one of the 4 samples shall be tested for, and shall conform to, the provisions for total slip. Should this sample not meet these requirements, one retest, in which the 3 remaining samples are tested for total slip, will be allowed. Should any of the 3 remaining samples not conform to these requirements, all splices in the lot represented by this production test will be rejected.

If 3 or more sample splices from any production test conform to the provisions in "Ultimate Butt Splice Test Criteria" specified herein, all splices in the lot represented by this production test will be considered acceptable.

Should only 2 sample splices from any production test conform to the provisions in "Ultimate Butt Splice Test Criteria" specified herein, one additional production test shall be performed on the same lot of splices. Should any of the 4 sample splices from this additional test fail to conform to these provisions, all splices in the lot represented by these production tests will be rejected.

If only one sample splice from any production test conforms to the provisions in "Ultimate Butt Splice Test Criteria" specified herein, all splices in the lot represented by this production test will be rejected.

If a production test for any lot fails, the Contractor will be required to repair or replace all reinforcing bars from which sample splices were removed, complete in place, before the Engineer selects any additional splices from this lot for further testing.

Whenever any lot of ultimate butt splices is rejected, additional ultimate butt splices shall not be used in the work until 1) the QCM performs a complete review of the Contractor's quality control process for these splices, 2) a written report is submitted to the Engineer describing the cause of failure for the splices in this lot and provisions for correcting these failures in future lots, and 3) the Engineer has provided the Contractor with written notification that the report is acceptable. The Engineer shall have 3 working days after receipt of the report to provide notification to the Contractor. Should the Engineer not provide notification within this time allowance, and if, in the opinion of the Engineer, the Contractor's controlling

operation is delayed or interfered with by reason of this action, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

Production tests will not be required on any repaired splice from a lot, regardless of the type of prequalified ultimate mechanical butt splice used to make the repair.

Should an additional production test be required, the Engineer may select any repaired splice for use in the additional production test.

QUALITY ASSURANCE TEST REQUIREMENTS FOR ULTIMATE BUTT SPLICES.--For the first production test performed, and for at least one, randomly selected by the Engineer, of every 5 additional production tests, or portion thereof, performed thereafter, the Contractor shall concurrently prepare 4 additional ultimate job control sample splices along with associated control bars. These ultimate job control samples shall be prepared in the same manner as specified herein for ultimate prejob sample splices and control bars.

Each time 4 additional ultimate job control sample splices are prepared, 2 of these job control sample splice and associated control bar sets and 2 of the production sample splice and associated control bar sets, together, shall conform to the requirements for ultimate production sample splices in "Production Test Requirements for Ultimate Butt Splices" specified herein.

The 2 remaining job control sample splice and associated control bar sets, along with the 2 remaining production sample splice and associated control bar sets shall be shipped, unless otherwise directed in writing by the Engineer, to the Transportation Laboratory for quality assurance testing. The 4 sets shall be securely bundled together and identified by location and contract number with weatherproof markings prior to shipment. Bundles containing fewer than 4 sets will not be tested.

Quality assurance testing will be performed in conformance with the requirements for ultimate production sample splices in "Production Test Requirements for Ultimate Butt Splices" specified herein.

Test results for each bundle of 4 sets will be reported in writing to the Contractor within 3 working days after receipt of the bundle by Transportation Laboratory. In the event that more than one bundle is received on the same day, 2 additional working days shall be allowed for providing test results for each additional bundle received. A test report will be made for each bundle received. Should the Contractor elect to encase any splices prior to receiving notification from the Engineer, it is expressly understood that the Contractor will not be relieved of the Contractor's responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Any material not conforming to these requirements will be subject to rejection. Should the Contractor elect to wait to encase any splices pending notification by the Engineer, and should the Engineer fail to complete the review and provide notification within this time allowance, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in notification, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

MEASUREMENT AND PAYMENT.--Full compensation for conforming to all of the requirements of this section shall be considered as included in the contract prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

10-1.60 EPOXY-COATED REINFORCEMENT

Epoxy-coated reinforcement shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

Section 52-1.02B, "Epoxy-coated Bar Reinforcement," of the Standard Specifications is replaced with the following:

52-1.02B Epoxy-coated Reinforcement.—Bar reinforcement to be epoxy-coated shall conform to the ASTM Designation and grade required or permitted by Section 52-1.02A, "Bar Reinforcement," for the location or type of structure involved. The epoxy-coated bar reinforcement shall conform to the provisions of ASTM Designation: A 775/A 775M, except as provided herein. Fabrication and jobsite handling of the epoxy-coated bar reinforcement shall conform to the provisions of ASTM Designation: D 3963/D 3963M, except as provided herein.

Wire reinforcement to be epoxy-coated shall conform to the ASTM Designation and grade required or permitted by Section 52-1.02D, "Reinforcing Wire and Plain Bars," for the location or type of structure involved. The coated wire reinforcement shall conform to the provisions for Class A, Type 1 coating of ASTM Designation: A 884/A 884M, except as provided herein.

Appendices X1, "Guidelines For Job-Site Practices," of ASTM Designations: A 775/A 775M and A 884/A 884M shall apply except as provided herein. The term "shall" shall replace the term "should" in these appendices. Sections X1.2 shall not apply.

Coatings shall be light green in color.

Except for field welding of butt splices, all welding of reinforcement shall be complete prior to epoxy coating the reinforcement.

When any portion of a reinforcing bar or wire requires epoxy coating, the entire bar or wire shall be coated.

Within areas where epoxy-coated reinforcement is required, tie wire and bar chairs or other metallic devices used to secure or support the reinforcement shall be plastic-coated or epoxy-coated to prevent corrosion of the devices or damage to the coated reinforcement.

Prior to coating, the Contractor shall furnish to the Transportation Laboratory a representative 4-ounce sample from each batch of epoxy coating material to be used. Each sample shall be packaged in an airtight container identified with the manufacturer's name and batch number.

Two 30-inch long samples of coated bar or wire reinforcement from each size and from each load shipped to the jobsite shall be furnished to the Engineer for testing. These samples shall be representative of the material furnished. These samples, as well as any additional random samples taken by the Engineer, may be tested for specification compliance. Additional sampling, and all tests performed by the Engineer, may be performed at any location deemed appropriate by the Engineer. Failure of any sample to meet the requirements of the specifications will be cause for rejection.

If any bar or wire reinforcement tested for coating thickness or for flexibility of coating fails to meet the requirements for coated bars in Section 8 of ASTM Designation: A 775/A 775M or A 884/A 884M, respectively, 2 retests on random samples taken from bars represented by the failed test will be conducted for each failed test. If the results of both retests meet the specified requirements, the coated bars represented by the samples may be certified as meeting the test requirements.

Epoxy-coated reinforcement shall be covered with an opaque polyethylene sheeting or other suitable protective material to protect the reinforcement from exposure to sunlight, salt spray and weather. For stacked bundles, the protective covering shall be draped around the perimeter of the stack. The covering shall be adequately secured; however, it should allow for air circulation around the reinforcement to prevent condensation under the covering. Epoxy-coated reinforcement shall not be stored within 1000 feet of ocean or tidal water for more than 2 months.

Visible damage to the coatings caused by shipping, handling or installation shall be repaired as required for repairing coating damaged prior to shipment as specified in ASTM Designation: A 775/A 775M for bar reinforcement or ASTM Designation: A 884/A 884M for wire reinforcement. When the extent of coating damage prior to repair exceeds 2 percent of the bar or wire surface area in any one foot length, repair of the bar or wire will not be allowed and the coated bar or wire will be rejected.

The patching material and process shall be suitable for field application. The patching material shall be prequalified as required for the coating material and shall be either identified on the container as a material compatible with the bar reinforcement coating, or shall be accompanied by a Certificate of Compliance certifying that the material is compatible with the bar reinforcement coating. Damaged areas shall be patched in accordance with the patching material manufacturer's recommendations. If damage to a bar occurs during field bending the area shall be patched immediately with the prequalified patching material.

Except for lap splices, all splices for epoxy-coated reinforcement shall be coated with a corrosion protection covering that is on the Department's list of approved products. The covering shall be installed in accordance with the manufacturer's recommendations and as directed by the Engineer. The list is available from the Division of Materials Engineering and Testing Services, 5900 Folsom Boulevard, Sacramento, CA 95819, telephone (916) 227-7000.

The third paragraph of Section 52-1.04, "Inspection," of the Standard Specifications is amended to read:

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished for each shipment of epoxy-coated bar or wire reinforcement certifying that the coated bars conform to the requirements of ASTM Designation: A 775/A 775M and Section 52-1.02B, "Epoxy-coated Bar Reinforcement." Said Certificate of Compliance shall include all the certifications specified in ASTM Designation: A 775/A 775M and a statement that the coating material has been prequalified by acceptance testing performed by the Valley Forge Laboratories, Inc., Devon, Pennsylvania.

MEASUREMENT AND PAYMENT

Measurement and payment for reinforcement in structures shall conform to the provisions in Sections 52-1.10, "Measurement," and 52-1.11, "Payment," of the Standard Specifications and these special provisions.

Epoxy-coated bar reinforcement shall be measured and paid for as bar reinforcing steel (bridge).

10-1.61 SHOTCRETE

Shotcrete shall conform to the provisions in Section 53, "Shotcrete," of the Standard Specifications and "Diaphragm Bolster," of these special provisions.

10-1.62 ASPHALT MEMBRANE WATERPROOFING

Asphalt membrane waterproofing shall conform to the provisions in Section 54, "Waterproofing," of the Standard Specifications and these special provisions.

Membrane waterproofing shall be applied to the painted undercoat of steel column casings in the same manner provided for waterproofing concrete surfaces.

The exposed surfaces of the membrane waterproofing applied to steel column casings shall be of uniform height above ground without unsightly bulges, depressions or other imperfections.

At the option of the Contractor, a preformed membrane waterproofing system may be furnished and applied in lieu of the asphalt membrane waterproofing specified above. Preformed membrane waterproofing shall conform to these special provisions.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished for the preformed membrane sheet. The Certificate of Compliance shall include the following information: (1) type of preformed membrane sheet, and (2) the conditioner or primer application rates.

The preformed membrane waterproofing system shall consist of an adhesive, conditioner or primer applied to a prepared surface; a preformed membrane sheet of rubberized asphalt, or polymer modified bitumen; mastic or tape for sealing the edges of the sheet; and a protective covering over the sheet held by an adhesive.

The preformed membrane sheet shall be either permanently applied to a polyethylene film or reinforced with a polypropylene mesh fabric, polyester/polypropylene fabric or a fiberglass mesh fabric. The membrane sheet shall conform to the following requirements:

Property	Test	Requirement	
		Polyethylene Film	Fabric Reinforced
Tensile Strength (Minimum)(1)	ASTM D 882 (2)	20 lbs/in. (3)	20 lbs/in. (3)
Percent Elongation at break (Minimum) (4)	ASTM D 882 (2)	150 percent (3)	25 percent (3)
Pliability	ASTM D 146 (5)	No cracks	No cracks
Thickness (Minimum) (6)		60 mils	60 mils
Rubberized Asphalt Softening Point (Minimum)	AASHTO T 53	165° F.	165° F
Polymer Modified Bitumen Softening Point (Minimum)	AASHTO T 53	210° F	210° F
Notes: (1) Breaking factor in machine direction. (2) Method A, average 5 samples. (3) At 73.4° F. ± 3.6° F. (4) Machine direction. (5) 180-degree bend over a one-inch mandrel at 10° F. (6) Total thickness of preformed membrane sheet and polyethylene film or fabric reinforcement.			

Adhesives, conditioners, primers, mastics and sealing tapes shall be manufactured for use with the respective preformed membrane sheet materials and shall be applied according to the manufacturer's recommendations.

The protective covering shall be 1/8 inch hardboard or other material that furnishes equivalent protection. Backfill material and equipment shall not cut, scratch, depress or cause any other damage to the preformed membrane.

Surfaces designated to receive preformed membrane waterproofing shall be thoroughly cleaned of dirt, dust, loose or unsound concrete, and other extraneous material and shall be free from fins, sharp edges and protrusions that would, in the opinion of the Engineer, puncture or otherwise damage the membrane. Sharp corners to be covered shall be rounded (outside) or chamfered (inside).

Surfaces shall be dry when components of the preformed membrane waterproofing system are applied.

Preformed membrane waterproofing shall not be applied to any surface until the Contractor is prepared to follow its application with the placing of the protective covering and backfill within a sufficiently short time that the membrane will not be damaged by workers or equipment, exposure to weathering, or from any other cause. Damaged membrane or protective covering shall be repaired or replaced by the Contractor at the Contractor's expense.

All projecting pipe, conduits, sleeves or other facilities passing through the preformed membrane waterproofing shall be flashed with prefabricated or field-fabricated boots, fitted coverings or other devices as necessary to provide watertight construction.

All conditioner or primers shall be thoroughly mixed and continuously agitated during application. Conditioner, primers or adhesive shall be allowed to dry to a tack free condition prior to placing membrane sheets.

The surfaces shall be recoated if membrane sheets are not placed over primer, conditioner or adhesive within the time recommended by the manufacturer.

The preformed membrane sheet shall not be applied in wet or foggy weather, nor when the ambient temperature is below 40° F.

Preformed membrane material shall be placed starting at the bottom and lapped by a minimum of 6 inches at splices and at repairs to holes or tears.

Exposed edges of membrane sheets shall have a trowelled bead of manufacturer's recommended mastic or sealing tape applied after the membrane is placed.

The surface of the preformed membrane shall be cleaned free of dirt and other deleterious material before the protective covering is placed.

The protective covering shall be placed on a coating of adhesive of a type recommended by the manufacturer. The adhesive shall be applied at a rate sufficient to hold the protective covering in position until the backfill is placed.

Preformed membrane waterproofing will be measured and paid for by the square foot as asphalt membrane waterproofing.

10-1.63 STEEL STRUCTURES

Construction of steel structures shall conform to the provisions in Section 55, "Steel Structures," of the Standard Specifications and these special provisions.

GENERAL

Attention is directed to "Welding Quality Control" of these special provisions.

The first paragraph in Section 55-1.02, "Drawings," of the Standard Specifications is amended to read:

55-1.02 Drawings.—The Contractor shall submit working drawings for structural steel to the Division of Structure Design (DSD) for approval, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings." For initial review, 6 sets of the drawings shall be submitted for highway bridges and 10 sets shall be submitted for railroad bridges. After review, between 6 and 12 sets, as requested by the Engineer, shall be submitted to DSD for final approval and for use during construction.

Paragraphs 7 through 9 of Section 55-1.02, "Drawings," of the Standard Specifications are amended to read:

At the completion of each structure on the contract, one set of reduced prints on 20 pound (minimum) bond paper, 11 inches by 17 inches in size, of the corrected original tracings of all working drawings for each structure shall be furnished to the Engineer. Reduced prints that are common to more than one structure shall be submitted for each structure. An index prepared specifically for the drawings for each structure containing sheet numbers and titles shall be included on the first reduced print in the set for each structure. Reduced prints for each structure shall be arranged in the order of drawing numbers shown in the index.

The edge of the corrected original tracing image shall be clearly visible and visually parallel with the edges of the page. A clear, legible symbol shall be provided on the upper left side of each page to show the amount of reduction and a horizontal and vertical scale shall be provided on each reduced print to facilitate enlargement to original scale.

For railroad bridges, in addition to the reduced prints of the working drawings, the Contractor shall furnish to the Engineer one set of working drawings consisting of either ink tracings on cloth, ink tracings on polyester base drafting film, silver sensitized cloth duplicate tracings, or silver sensitized polyester based reproduction films with matte surface on both sides.

Steel for members, shown on the plans as fracture critical members, shall conform to the Charpy V-notch (CVN) impact values, welding and welding inspection of the Fracture Control Plan for Fracture Critical Members in Chapter 15, Part 1 of the AREA Manual of Railway Engineering. Fabricators of fracture critical members shall be certified under the AISC Quality Certification Program, Category Cbr, Major Steel Bridges. CVN impact values for fracture critical members shall conform to the requirements for Zone 2.

The first sentence of the second paragraph in Section 55-1.03, "Inspection," of the Standard Specifications is amended to read:

The Contractor shall furnish to the Engineer a copy of mill orders, certified mill test reports, Certificates of Compliance for all fabricated structural steel to be used in the work, other than steel which is to be used under the provisions in Section 55-2.07, "Unidentified Stock Material, " and other reports or certificates required by the specifications.

MATERIALS

The first paragraph, including the material table, in Section 55-2.01, "Description," of the Standard Specifications is amended to read:

55-2.01 Description.—The various materials shall conform to the specifications of ASTM as listed in the following tabulation with certain modifications and additions as specified:

MATERIAL	SPECIFICATION
Structural steel	ASTM Designation: A 709/A 709M, Grade 36 [250] or A 36/A 36M ^(a)
High strength low alloy columbium vanadium steel	ASTM Designation: A 709/A 709M, Grade 50 [345] or A 572/A 572M, Grade 50 [345] ^(a)
High strength low alloy structural steel	ASTM Designation: A 709/A 709M, Grade 50W [345 W] or A 588/A 588M ^(a)
High-yield strength, quenched and tempered alloy steel plate suitable for welding	ASTM Designation: A 709/A 709M, Grade 100 [690] and Grade 100W [690W] or A 514/A 514M ^(a)
Steel fastener components for general applications:	
Bolts and studs	ASTM Designation: A 307
Headed anchor bolt	ASTM Designation: A 307, Grade B, including S1 supplementary requirements
Non-headed anchor bolts	ASTM Designation: A 307, Grade C, including S1 supplementary requirements and S1.6 of AASHTO Designation: M 314 supplementary requirements or AASHTO Designation: M 314, Grade 36 or 55, including S1 supplementary requirements
High-strength bolts and studs which include threaded rods and high-strength non-headed anchor bolts	ASTM Designation: A 449, Type 1
Nuts	ASTM Designation: A 563 including Appendix X1 ^(b)
Washers	ASTM Designation: F 844
Components of high strength steel fastener assemblies for use in structural steel joints:	
Bolts	ASTM Designation: A 325, Type 1
Tension control bolts	ASTM Designation: F 1852, Type 1
Nuts	ASTM Designation: A 563 including Appendix X1 ^(b)
Hardened washers	ASTM Designation: F 436, Type 1, Circular, including S1 supplementary requirements
Direct tension indicators	ASTM Designation: F 959, Type 325, zinc-coated
Carbon steel for forgings, pins and rollers	ASTM Designation: A 668/A 668M, Class D
Alloy steel for forgings	ASTM Designation: A 668/A 668M, Class G
Pin nuts	ASTM Designation: A 36/A 36M
Carbon-steel castings	ASTM Designation: A 27/A 27M, Grade 65-35 [450-240], Class 1

Malleable iron castings	ASTM Designation: A 47, Grade 32510 or A 47M, Grade 22010
Gray iron castings	ASTM Designation: A 48, Class 30B
Carbon steel structural tubing	ASTM Designation: A 500, Grade B or A 501
Steel pipe (Hydrostatic testing will not apply)	ASTM Designation: A 53, Type E or S, Grade B; A 106, Grade B; or A 139, Grade B
Stud connectors	ASTM Designation: A 108 and ANSI/AASHTO/AWS D1.5
<p>(a) Grades that may be substituted for the equivalent ASTM Designation: A 709 steel, at the Contractor's option, subject to the modifications and additions specified and to the requirements of A 709.</p> <p>(b) Zinc-coated nuts that will be tightened beyond snug or wrench tight shall be furnished with a dry lubricant conforming to Supplementary Requirement S2 in ASTM Designation: A 563.</p>	

The second paragraph in Section 55-2.01, "Description," of the Standard Specifications is deleted.

The fifth paragraph in Section 55-2.01, "Description," of the Standard Specifications is amended to read:

All structural steel plate used for the fabrication of tension members, tension flanges, eyebars and hanger plates and for splice plates of tension members, tension flanges and eyebars shall meet the longitudinal Charpy V-notch impact value requirements specified herein. Sampling procedures shall conform to the provisions in ASTM Designation: A 673/A 673M. The H (Heat) frequency of testing shall be used for structural steels conforming to ASTM Designations: A 709/A 709M, Grades 36, 50 and 50W. The P (Piece) frequency of testing shall be used for structural steel conforming to ASTM Designation: A 709/A 709M, Grades 100 and 100W. Charpy V-notch impact values shall be determined in conformance with ASTM Designation: E 23.

The first paragraph in Section 55-2.02, "Structural Steel," of the Standard Specifications is amended to read:

55-2.02 Structural Steel.—Unless otherwise specified or shown on the plans, all structural steel plates, shapes and bars shall conform to ASTM Designation: A 709/A 709M, Grade 36.

High-strength fastener assemblies, and other bolts attached to structural steel with nuts and washers shall be zinc-coated. When direct tension indicators are used in these assemblies, the direct tension indicator and all components of the fastener assembly shall be zinc-coated by the mechanical deposition process.

FABRICATION

Paragraphs 1 through 5, excluding Section 55-3.14A, of Section 55-3.14, "Bolted Connections," of the Standard Specifications are amended to read:

55-3.14 Bolted Connections.—Bolted connections in structural steel joints, unless otherwise shown on the plans or specified in the special provisions, shall be made with high-strength steel fastener assemblies. These fastener assemblies shall consist of either 1) a high-strength steel bolt, nut and hardened washer or 2) a tension control bolt, nut and hardened washer. A direct tension indicator (DTI) may be used with the high-strength bolt, nut and hardened washer assembly.

Bolted connections using fastener assemblies shall conform to the requirements in "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" (RCSC Specification) approved by the Research Council on Structural Connections of the Engineering Foundation, and these specifications.

When reference is made to the RCSC Specification, the "Allowable Stress Design" version shall be used when allowable stress design is shown on the plans and the "Load and Resistance Factor Design" version shall be used when load factor design or load and resistance factor design is shown on the plans.

All connections made with fastener assemblies shall be tensioned as a slip critical connection, whether classified as a slip critical or bearing type connection, unless otherwise designated on the plans.

The hardened washer shall be installed under the nut or bolt head, whichever is the element turned in tightening. Nuts shall be located, wherever practicable, on the side of the member that will not be visible from the traveled way. Nuts for bolts that will be partially embedded in concrete shall be located on the side of the member that will be encased in concrete.

When the bolt head is used as the turned element, all tension testing and tension verification, including determining job inspecting torque, shall be performed by turning the bolt head.

Each length and diameter of fastener assemblies used in any one joint of a high-strength bolted connection shall be from the same rotational capacity lot. The Contractor shall keep a record of which rotational capacity lots are used in each joint.

The Contractor shall provide, calibrate and maintain the equipment and tools necessary for the preliminary testing, installation and inspection of all fasteners.

Bolt tension measuring devices and calibrated wrenches shall be calibrated within one year prior to first being used on the job, and a minimum of once each year thereafter. This calibration shall be done by a qualified independent laboratory or authorized warranty repair and calibration center recognized by the tool manufacturer. Bolt tension measuring devices shall be calibrated, to within one percent of the actual tension value, with a minimum of 4 verification readings evenly spaced over a range of 20 to 80 percent of full scale. Calibrated wrenches shall be calibrated to within 2 percent of the actual torque value, with a minimum of 4 verification readings evenly spaced over a range of 20 to 100 percent of full scale. Test equipment used for certification and calibration standards shall be traceable to the National Institute of Standards and Technology.

If a torque multiplier is used in conjunction with a calibrated wrench as a method for tightening fastener assemblies to the required tension, both the multiplier and the wrench shall be calibrated together as a system. The same length input and output sockets and extensions that will be used in the work shall also be included in the calibration of the system. The manufacturer's torque multiplication ratio shall be adjusted during calibration of the system, such that when this adjusted ratio is multiplied by the actual input calibrated wrench reading, the product is a calculated output torque that is within 2 percent of the true output torque. When this system is used in the work to perform any installation tension testing, rotational capacity testing, fastener tightening, or tension verification, it shall be used, intact as calibrated.

Prior to the use of bolt tension measuring devices or calibrated wrenches, the Contractor shall furnish to the Engineer certificates of calibration with plots of verification readings for each device or wrench.

In addition to the submittals required in Section 55-1.03, "Inspection," the Contractor shall furnish certified test reports of tests on fastener components and fastener assemblies performed prior to shipment to the job-site. Certified test reports for fastener components and fastener assemblies shall be furnished to the Engineer prior to use of the fastener assembly. The certified test reports shall include the rotational capacity lot numbers for fastener assemblies supplied and all test reports specified in the "Certification," "Report," "Number of Tests and Retests," and "Certification and Test Report" sections in the appropriate ASTM specifications for the fastener components. For ASTM Designation: A 307, Grade B or Grade C anchor bolts, the chemical composition and calculated carbon equivalent of each heat of steel shall be furnished.

All bolted connection surfaces shall be prepared before assembly in conformance with the requirements in the special provisions.

Section 55-3.14, "Bolted Connections," of the Standard Specifications is amended by adding the following paragraphs:

55-3.14B Installation.—If any components of fastener assemblies are furnished with water soluble lubricants, fastener installation will not be permitted when surface moisture is present at a high-strength bolted connection. If fastener assemblies are furnished with other than water soluble lubricants, the Engineer may require the Contractor to perform additional fastener testing if any fastener work or testing is performed when surface moisture is present.

Manual torque wrenches shall have either a dial gage or digital read out. Any electric, pneumatic or hydraulic calibrated wrench used to tension fasteners shall have an adjustable control unit that can be set to positively shut off at the desired torque.

Wrenches used for snugging tension control bolts in a connection prior to final tensioning shall not apply torsion to the splined end of the bolt.

The threaded ends of fastener assemblies projecting past the outer face of the nut (thread stickout), where first full formed threads are present, shall be at least flush with, but not extend more than 1/4-inch beyond, the outer face of the nut. A maximum of one hardened washer, in addition to the single washer required under the turned element, may be installed under the non-turning element of the fastener assembly. The thread stickout of studs, rods and anchor bolts, shall be at least 1/8-inch, and there shall be a minimum of 3 full threads located within the grip of the connection. In addition, a minimum of 3 full threads shall be located between the bearing surfaces of the bolt head and nut. The total stickout shall not be excessive.

Larger bolts, having diameters up to 1/4-inch greater than the diameter of the bolt shown on the plans, may be used if approved by the Engineer provided that spacing and edge distance requirements for the larger bolt are met and the net section is adequate.

When direct tension indicators are used, one direct tension indicator shall be installed under each bolt head with the direct tension indicator protrusions contacting the bearing surface of the bolt head. To tension the bolt, the bolt head shall be held stationary and the nut turned. Unless otherwise specified, manufacturer's installation procedures shall be followed. Each bolt shall be tensioned in at least 2 tightening stages until at least 50 percent of the gaps on each direct tension indicator are greater than zero and less than 0.005 inch. Complete crushing of all direct tension indicator protrusions (0 gaps) on any given direct tension indicator will be cause for rejection.

The same head orientation shall be used within any one high-strength bolted connection.

55-3.14C Rotational Capacity Testing Prior to Shipment to Job Site.—Rotational capacity tests on fastener assemblies shall be performed as specified in the special provisions.

55-3.14D Installation Tension Testing and Rotational Capacity Testing After Arrival to Job Site.—Installation tension tests and rotational capacity tests on fastener assemblies shall be performed as specified in the special provisions.

55-3.14E Tension Verification of Fastener Assemblies.—Minimum fastener tension in all completed high-strength bolted connections shall be verified.

For each type of fastener assembly, at least 10 percent, but no fewer than 2 assemblies used in each high-strength bolted connection shall be checked for minimum tension, by the Contractor, in conformance with the procedure described in Section 9(b), "Arbitration Inspection," of the RCSC Specification. For determining the job inspecting torque for short bolts, the procedure described in steps 1 through 9 of the "Arbitration of Disputes, Inspection Torque Method-Short Bolts," section of the "Structural Bolting Handbook," published by the Steel Structures Technology Center, Incorporated shall replace Section 9(b)(2) of the RCSC Specification. A separate inspecting torque shall be determined and used for each different rotational capacity lot of fasteners.

The verification for minimum tension shall be performed 1) no longer than 48 hours after all fasteners in the connection have been tensioned, 2) on fastener assemblies selected by the Engineer, 3) in the presence of the Engineer, and 4) in such a manner that the Engineer can read the torque wrench gage or access the direct tension indicator gaps during inspection.

Rotational Capacity Testing Prior to Shipment to Job Site

Rotational capacity tests shall be performed on all lots of high-strength fastener assemblies prior to shipment of these lots to the job site. Zinc-coated assemblies shall be tested after all fabrication, coating and lubrication of components have been completed. One hardened washer shall be used under each nut for the tests.

Each combination of bolt production lot, nut lot and washer lot shall be tested as an assembly.

A rotational capacity lot number shall be assigned to each combination of lots tested. Each shipping unit of fastener assemblies shall be plainly marked with the rotational capacity lot number.

Two fastener assemblies from each rotational capacity lot shall be tested.

The following equipment, procedure and acceptance criteria shall be used to perform rotational capacity tests on, and determine acceptance of long bolts. Fasteners are considered to be long bolts when full nut thread engagement can be achieved when installed in a bolt tension measuring device.

Long Bolt Test Equipment:

1. Calibrated bolt tension measuring device with adequate tension capacity for the bolts being tested.
2. Calibrated dial or digital torque wrench. Other suitable tools will be required for performing Steps 7 and 8 of this procedure. A torque multiplier may be required for large diameter bolts.
3. Spacer washers or bushings. When spacer washers or bushings are required, they shall have the same inside diameter and equal or larger outside diameter as the appropriate hardened washers conforming to the requirements of ASTM Designation: F436.
4. Steel beam or member, such as a girder flange or cross frame, to which the bolt tension measuring device will be attached. The device shall be accessible from the ground.

Long Bolt Test Procedure:

1. Measure the bolt length. The bolt length is defined as the distance from the end of the threaded portion of the shank to the underside of the bolt head.

2. Install the nut on the bolt so that 3 to 5 full threads of the bolt are located between the bearing face of the nut and the underside of the bolt head. Measure and record the thread stickout of the bolt. Thread stickout is determined by measuring the distance from the outer face of the nut to the end of the threaded portion of the shank.
3. Insert the bolt into the bolt tension measuring device and install the required number of washers, and additional spacers as needed, directly beneath the nut to produce the thread stickout measured in Step 2.
4. Tighten the nut using a hand wrench to a snug-tight condition. The snug tension shall not be less than the Table A value but may exceed the Table A value by a maximum of 2 kips.

Table A

High-Strength Fastener Assembly Tension Values to Approximate Snug-Tight Condition	
Bolt Diameter (inches)	Snug Tension (kips)
1/2	1
5/8	2
3/4	3
7/8	4
1	5
1 1/8	6
1 1/4	7
1 3/8	9
1 1/2	10

5. Match-mark the assembly by placing a heavy reference start line on the face plate of the bolt tension measuring device which aligns with 1) a mark placed on one corner of the nut, and 2) a radial line placed across the flat on the end of the bolt, or on the exposed portions of the threads of tension control bolts. Place an additional mark on the outside of the socket that overlays the mark on the nut corner such that this mark will be visible while turning the nut. Make an additional mark on the face plate, either 2/3 of a turn, one turn, or 1 1/3 turn clockwise from the heavy reference start line, depending on the bolt length being tested as shown in Table B.

Table B

Required Nut Rotation for Rotational Capacity Tests ^(a,b)	
Bolt Length (measured in Step 1)	Required Rotation (turn)
4 bolt diameters or less	2/3
Greater than 4 bolt diameters but no more than 8 bolt diameters	1
Greater than 8 bolt diameters, but no more than 12 bolt diameter (c)	1 1/3
<p>(a) Nut rotation is relative to bolt, regardless of the element (nut or bolt) being turned. For bolts installed by 1/2 turn and less, the tolerance shall be plus or minus 30 degrees; for bolts installed by 2/3 turn and more, the tolerance shall be plus or minus 45 degrees.</p> <p>(b) Applicable only to connections in which all material within grip of the bolt is steel.</p> <p>(c) When bolt lengths exceed 12 diameters, the required rotation shall be determined by actual tests in a suitable tension device simulating the actual conditions.</p>	

6. Turn the nut to achieve the applicable minimum bolt tension value listed in Table C. After reaching this tension, record the moving torque, in foot-pounds, required to turn the nut, and also record the corresponding bolt tension value in pounds. Torque shall be measured with the nut in motion. Calculate the value, T (in ft-lbs), where $T = [(\text{the measured tension in pounds}) \times (\text{the bolt diameter in inches}) / 48 \text{ in/ft}]$.

Table C

Minimum Tension Values for High-Strength Fastener Assemblies	
Bolt Diameter (inches)	Minimum Tension (kips)
1/2	12
5/8	19
3/4	28
7/8	39
1	51
1 1/8	56
1 1/4	71
1 3/8	85
1 1/2	103

6. Turn the nut further to increase bolt tension until the rotation listed in Table B is reached. The rotation is measured from the heavy reference line made on the face plate after the bolt was snug-tight. Record this bolt tension.
8. Loosen and remove the nut and examine the threads on both the nut and bolt.

Long Bolt Acceptance Criteria:

An assembly shall pass all of the following requirements to be acceptable: 1) the measured moving torque (Step 6) shall be less than or equal to the calculated value, T (Step 6), 2) the bolt tension measured in Step 7 shall be greater than or equal to the applicable turn test tension value listed in Table D, 3) the nut shall be able to be removed from the bolt without signs of thread stripping or galling after the required rotation in Step 7 has been achieved, 4) the bolt does not shear from torsion or fail during the test and 5) the assembly does not seize before the final rotation in Step 7 is reached. Elongation of the bolt in the threaded region between the bearing face of the nut and the underside of the bolt head is expected and will not be considered a failure. Both fastener assemblies tested from one rotational capacity lot shall pass for the rotational capacity lot to be acceptable.

Table D

Turn Test Tension Values	
Bolt Diameter (inches)	Turn Test Tension (kips)
1/2	14
5/8	22
3/4	32
7/8	45
1	59
1 1/8	64
1 1/4	82
1 3/8	98
1 1/2	118

The following equipment, procedure and acceptance criteria shall be used to perform rotational capacity tests on and determine acceptance of short bolts. Fasteners are considered to be short bolts when full nut thread engagement cannot be achieved when installed in a bolt tension measuring device.

Short Bolt Test Equipment:

1. Calibrated dial or digital torque wrench. Other suitable tools will be required for performing Steps 7 and 8 of this procedure. A torque multiplier may be required for large diameter bolts.
2. Spud wrench or equivalent.
3. Spacer washers or bushings. When spacer washers or bushings are required, they shall have the same inside diameter and equal or larger outside diameter as the appropriate hardened washers conforming to the requirements of ASTM Designation: F436.
4. Steel plate or girder with a hole to install bolt. The hole size shall be 1/16 inch greater than the nominal diameter of the bolt to be tested. The grip length, including any plates, washers, and additional spacers as needed, shall provide the proper number of threads within the grip, as required in Step 2 of the Short Bolt Test Procedure.

Short Bolt Test Procedure:

1. Measure the bolt length. The bolt length is defined as the distance from the end of the threaded portion of the shank to the underside of the bolt head.
2. Install the nut on the bolt so that 3 to 5 full threads of the bolt are located between the bearing face of the nut and the underside of the bolt head. Measure and record the thread stickout of the bolt. Thread stickout is determined by measuring the distance from the outer face of the nut to the end of the threaded portion of the shank.
3. Install the bolt into a hole on the plate or girder and install the required number of washers, and additional spacers as needed, between the bearing face of the nut and the underside of the bolt head to produce the thread stickout measured in Step 2.
4. Tighten the nut using a hand wrench to a snug-tight condition. The snug condition shall be the full manual effort applied to the end of a 12-inch long wrench. This applied torque shall not exceed 20 percent of the maximum allowable torque in Table E.

Table E

Maximum Allowable Torque for High-Strength Fastener Assemblies	
Bolt Diameter (inches)	Torque (ft-lbs)
1/2	145
5/8	285
3/4	500
7/8	820
1	1220
1 1/8	1500
1 1/4	2130
1 3/8	2800
1 1/2	3700

5. Match-mark the assembly by placing a heavy reference start line on the steel plate or girder which aligns with 1) a mark placed on one corner of the nut, and 2) a radial line placed across the flat on the end of the bolt, or on the exposed portions of the threads of tension control bolts. Place an additional mark on the outside of the socket that overlays the mark on the nut corner such that this mark will be visible while turning the nut. Make 2 additional small marks on the steel plate or girder, one 1/3 of a turn and one 2/3 of a turn clockwise from the heavy reference start line on the steel plate or girder.
6. Using the torque wrench, tighten the nut to the rotation value listed in Table F. The rotation is measured from the heavy reference line described in Step 5 made after the bolt was snug-tight. A second wrench shall be used to prevent rotation of the bolt head during tightening. Measure and record the moving torque after this rotation has been reached. The torque shall be measured with the nut in motion.

Table F

Nut Rotation Required for Turn-of-Nut (a,b) Installation	
Bolt Length (measured in Step 1)	Required Rotation (turn)
4 bolt diameters or less	1/3
(a) Nut rotation is relative to bolt, regardless of the element (nut or bolt) being turned. For bolts installed by 1/2 turn and less, the tolerance shall be plus or minus 30 degrees.	
(b) Applicable only to connections in which all material within grip of the bolt is steel.	

7. Tighten the nut further to the 2/3 turn mark as indicated in Table G. The rotation is measured from the heavy reference start line made on the plate or girder when the bolt was snug-tight. Verify that the radial line on the bolt end, or on the exposed portions of the threads of tension control bolts, is still in alignment with the start line.

Table G

Required Nut Rotation for Rotational Capacity Test	
Bolt Length (measured in Step 1)	Required Rotation (turn)
4 bolt diameters or less	2/3

8. Loosen and remove the nut and examine the threads on both the nut and bolt.

Short Bolt Acceptance Criteria:

An assembly shall pass the following requirements to be acceptable: 1) the measured moving torque from Step 6 shall be less than or equal to the maximum allowable torque from Table E, 2) the nut shall be able to be removed from the bolt without signs of thread stripping or galling after the required rotation in Step 7 has been achieved, 3) the bolt does not shear from torsion or fail during the test and 4) the assembly does not seize before the final rotation in Step 7 is reached. Elongation of the bolt in the threaded region between the bearing face of the nut and the underside of the bolt head will not be considered a failure. Both fastener assemblies tested from one rotational capacity lot shall pass for the rotational capacity lot to be acceptable.

Installation Tension Testing and Rotational Capacity Testing After Arrival on the Job Site.—Installation tension tests and rotational capacity tests on high-strength fastener assemblies shall be performed by the Contractor prior to acceptance or installation, and after arrival of the fastener assemblies on the job-site. The installation tension tests and rotational capacity tests shall be performed at the job-site, in the presence of the Engineer, on each rotational capacity lot of fastener assemblies.

Installation tension tests shall be performed on 3 representative fastener assemblies in conformance with Section 8, "Installation and Tightening," of the RCSC Specification. For short bolts, Section 8(d), "Joint Assembly and Tightening of Slip-Critical and Direct Tension Connections," of the RCSC Specification shall be replaced by the "Pre-Installation Testing Procedures," of the "Structural Bolting Handbook," published by the Steel Structures Technology Center, Incorporated.

The rotational capacity tests shall be performed in conformance with the requirements for rotational capacity tests in "Rotational Capacity Testing Prior to Shipment to Job Site" of these special provisions.

At the Contractor's expense, additional installation tension tests, tests required to determine job inspecting torque and rotational capacity tests shall be performed by the Contractor on each rotational capacity lot, in the presence of the Engineer, if 1) any fastener is not used within 3 months after arrival on the jobsite, 2) fasteners are improperly handled, stored, or subjected to inclement weather prior to final tightening, 3) significant changes are noted in original surface condition of threads, washers or nut lubricant or 4) the Contractor's required inspection is not performed within 48 hours after all fasteners in a joint have been tensioned.

Failure of a job-site installation tension test or a rotational capacity test will be cause for rejection of unused fasteners which are part of the rotational capacity lot.

When direct tension indicators are used, installation verification tests shall be performed in conformance with appendix section X1.4 of ASTM Designation: F959, except that bolts shall be initially tensioned to a value 5 percent greater than the minimum required bolt tension.

Surface Preparation

For all bolted connections, the 1) contact surfaces, 2) surfaces of outside existing members within the grip under bolt heads, nuts and washers and 3) inside surfaces of bolt holes shall be cleaned and coated before assembly in conformance with the provisions for cleaning and painting structural steel of these special provisions.

Sealing

When zinc-coated tension control bolts are used, the sheared end of each fastener shall be completely sealed with non-silicone type sealing compound conforming to the provisions in Federal Specification TT-S-230, Type II. The sealant shall be gray in color and shall have a minimum thickness of 50 mils. The sealant shall be applied to a clean sheared surface on the same day that the splined end is sheared off.

Welding

Section 55-3.17, "Welding," of the Standard Specifications is amended by adding the following paragraph:

The flat side of all butt welded joints shall not deviate from flatness by more than 3/16 inch in a length of 2 feet centered over the weld joint.

The third paragraph of Section 55-3.17, "Welding," of the Standard Specifications is amended to read:

In addition to the nondestructive testing requirements in ANSI/AASHTO/AWS D1.5, 25 percent of all main member tension groove welds, in material in excess of 1/2 inch thickness, shall be ultrasonically tested.

The last three paragraphs in Section 55-3.19, "Bearings and Anchorages," of the Standard Specifications are amended to read:

Mortar to be placed below masonry plates or bearing plates of the bearing assemblies and in anchor bolt sleeves or canisters shall conform to the requirements in Section 51-1.135, "Mortar," of the Standard Specifications except that the proportion of cement to sand shall be one to three.

The embedded end of anchor bolts shall be either headed or with a nut and washer. Anchor bolts shall be installed with or without either pipe sleeves or corrugated metal canisters, as detailed on the plans. The anchor bolts shall be carefully installed to permit true positioning of the bearing assemblies.

When anchor bolts are installed in pipe sleeves or metal canisters, the pipes or canisters shall be completely filled with mortar. Such mortaring and the construction of mortar pads under masonry plates, if required, shall be done after erection of girders and before placing deck concrete.

MEASUREMENT AND PAYMENT.--Measurement and payment for steel structures shall conform to the provisions in Sections 55-4.01, "Measurement," and 55-4.02, "Payment," of the Standard Specifications and these special provisions.

The sixth paragraph in Section 55-4.02, "Payment," of the Standard Specifications is amended to read:

If a portion or all of the welded structural steel is fabricated more than 300 air line miles from both Sacramento and Los Angeles, additional shop inspection expenses will be sustained by the State. Whereas it is and will be impracticable and extremely difficult to ascertain and determine the actual increase in such expenses, it is agreed that payment to the Contractor for furnishing said structural steel from each fabrication site located more than 300 air line miles from both Sacramento and Los Angeles will be reduced \$5,000 or by an amount computed at \$0.020 per pound of structural steel fabricated, whichever is greater, or in the case of each fabrication site located more than 3,000 air line miles from both Sacramento and Los Angeles, payment will be reduced \$8,000 or by \$0.036 per pound of structural steel fabricated, whichever is greater.

10-1.64 COLUMN CASINGS

Column casings shall consist of cleaned and painted structural steel shells filled with grout as shown on the plans and conforming to the provisions in Section 55, "Steel Structures," of the Standard Specifications and these special provisions.

Attention is directed to "Welding Quality Control" of these special provisions.

The requirements of the first sentence of paragraph 3.13.2 of AWS D1.5 will not apply for the field welding of column casings.

Structural steel for column casings shall conform to the requirements in ASTM Designation: A 36/A 36M, or at the Contractor's option, ASTM Designation: A 709/A 709M, Grade 36.

The spaces to be occupied by the column casing materials shall be cleared of plants and other materials prior to encasing the column.

Removed plants and other materials shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

CLEAN AND PAINT STRUCTURAL STEEL.--New metal surfaces, except where galvanized, shall be cleaned and painted in conformance with the provisions in Sections 59-2, "Painting Structural Steel," and 91, "Paint," of the Standard Specifications and these special provisions.

Whenever the Standard Specifications refer to "Steel Structures Painting Council," the reference shall be replaced with "SSPC: The Society for Protective Coatings."

The fifth paragraph in Section 59-1.03, "Application," of the Standard Specifications is amended to read:

Unless otherwise specified, should 7 days elapse between paint applications, the painted surface shall be water rinsed prior to the next paint application. Water rinsing shall be defined as a pressurized water rinse with a minimum nozzle pressure of 300 psi. During rinsing, the tip of the pressure nozzle shall be placed between 12 and 18 inches from the surface to be rinsed.

The ninth paragraph in Section 59-1.03, "Application," of the Standard Specifications is amended to read:

Runs, sags, thin and excessively thick areas in the paint film, skips and holidays, or areas of non-uniform appearance shall be considered as evidence that the work is unsatisfactory, and the Contractor may be required to blast clean the areas and reapply the paint.

The first subparagraph of the first paragraph in Section 59-2.12, "Painting," of the Standard Specifications is amended to read:

Structures, other than sign structures, shall be blast cleaned and painted with the total thickness of undercoats before erection. Finish coats and final coats shall be applied after erection. If concrete deck is to be placed on a steel member to be painted, finish coats and final coats shall be applied after concrete deck placement. After erection, deck placement, and before applying subsequent paint, all areas where paint has been damaged or has deteriorated and all exposed unpainted surfaces shall be thoroughly cleaned, all foreign substances shall be removed, and surfaces shall be spot painted with undercoats to the specified thickness. Damaged areas of undercoat paint shall be blast cleaned and painted as specified in the special provisions.

The fourth paragraph in Section 59-2.12, "Painting," of the Standard Specifications is amended to read:

The dry film thickness of the paint will be measured in place with a calibrated Type 2 magnetic film thickness gauge according to Steel Structure Painting Council Specification SSPC-PA2.

Prior to performing any painting or paint removal, the Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 3 copies of a separate Painting Quality Work Plan (PQWP) for each item of work for which painting or paint removal is to be performed. As a minimum, each PQWP shall include the following:

- A. The name of each Contractor or subcontractor to be used.
 - B. One copy each of all current "SSPC: The Society for Protective Coatings" specifications or qualification procedures which are applicable to the painting or paint removal to be performed. These documents shall become the permanent property of the Department.
 - C. Proposed methods and equipment to be used for any paint application.
 - D. Proof of each of any required certifications, SSPC-QP 1 or SSPC-QP 3.
1. In lieu of certification in conformance with the requirements in SSPC-QP 1 for this project, the Contractor may submit written documentation showing conformance with the requirements in Section 3, "General Qualification Requirements," of SSPC-QP 1.

2. In lieu of certification in conformance with the requirements in SSPC-QP 3 for this project, the Contractor may submit written documentation showing conformance with the requirements in Section 3, "General Qualification Requirements," of SSPC-QP 3.

The Engineer shall have 10 working days to review the PQWP submittal after a complete plan has been received. No painting or paint removal shall be performed until the PQWP for that work is reviewed by the Engineer. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the PQWP, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

It is expressly understood that the Engineer's review of the Contractor's PQWP shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work in conformity with the requirements of the plans and specifications. The Engineer's review shall not constitute a waiver of any of the requirements of the plans and specifications nor relieve the Contractor of any obligation thereunder, and defective work, materials, and equipment may be rejected notwithstanding review of the PQWP.

The existing paint systems consist of materials listed in "Existing Highway Facilities" of these special provisions.

Column casing surfaces in contact with grout shall not be considered embedded in concrete.

Column casing surfaces to be painted with waterborne inorganic zinc coating shall be blast cleaned and painted with the single undercoat prior to shipment to the job-site.

CLEANING.--The surfaces to be cleaned and painted shall be dry blast cleaned in conformance with the requirements in Surface Preparation Specification No. 10, "Near White Blast Cleaning," of the "SSPC: The Society for Protective Coatings." Blast cleaning shall leave surfaces with a dense, uniform, angular, anchor pattern of no less than 1 1/2 mils as measured in conformance with the requirements of ASTM Designation: D 4417.

Mineral and slag abrasives used for blast cleaning steel shall conform to the requirements of Abrasive Specification No. 1, "Mineral and Slag Abrasives," of "SSPC: The Society for Protective Coatings," and shall not contain hazardous material. Mineral and slag abrasives shall comply with the requirements for Class A, Grade 2 to 3 as defined therein.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications and a Material Safety Data Sheet shall be furnished prior to use for each shipment of blast cleaning material for existing steel.

PAINTING.--Blast cleaned surfaces shall receive a single undercoat, and a final coat where specified, consisting of a waterborne inorganic zinc coating conforming to the requirements in AASHTO Designation M 300, Type II, except that: 1) the first 3 sentences of Section 4.7, "Primer Field Performance Requirements," and the entire Section 4.7.1 shall not apply, and 2) zinc dust shall be Type II in conformance with the requirements in ASTM Designation: D 520. The inorganic zinc coating shall be listed on the qualified products list which may be obtained from the Transportation Laboratory.

The color of the final coat of inorganic zinc coating shall closely match Federal Standard 595B No. 36373.

Inorganic zinc coating shall be used within 12 hours of initial mixing.

Inorganic zinc coating shall not be applied when the atmospheric or surface temperature is less than 45° F or more than 85° F or when the relative humidity exceeds 85 percent.

The single undercoat of inorganic zinc coating shall be applied to the required dry film thickness in 2 or more applications within 4 hours after blast cleaning.

The total dry film thickness of all applications of the single undercoat of inorganic zinc coating shall be not less than 4 mils nor more than 8 mils.

Damaged areas and areas where mudcracking occurs in the inorganic zinc coating shall be blast cleaned and repainted with inorganic zinc coating to the specified thickness.

Dry spray, or overspray, as defined in the Steel Structures Painting Manual, Volume 1, "Good Painting Practice," of the "SSPC: The Society for Protective Coatings," shall be removed prior to application of subsequent coats or final acceptance. Removal of dry spray shall be by screening or other methods that minimize polishing of the inorganic zinc surface. The dry film thickness of the coating after removal of dry spray shall be in conformance with the provisions for applying the single undercoat, as specified herein.

The inorganic zinc coating shall be tested for adhesion and cure. The locations of the tests will be determined by the Engineer. The sequence of the rinsing and testing operations shall be determined by the Contractor. The testing for adhesion and cure will be performed no sooner than 72 hours after application of the single undercoat of inorganic zinc coating. At the Contractor's expense, satisfactory access shall be provided to allow the Engineer to determine the location of the tests and to test the inorganic zinc coating cure. The inorganic zinc coating shall pass both of the following tests:

Adhesion.--The inorganic zinc coating shall have a minimum adhesion to steel of 600 psi when measured at no more than 6 locations on each column using a self-aligning adhesion tester in conformance with the requirements in ASTM Designation: D 4541. The Contractor, at the Contractor's expense, shall: (1) verify compliance with the adhesion requirements, (2) furnish test results to the Engineer, and (3) repair the coating after testing.

Cure.--The inorganic zinc coating, when properly cured, shall exhibit a solid, hard and polished metal surface when firmly scraped with the knurled edge of a quarter. Inorganic zinc coating that is powdery, soft or does not exhibit a polished metal surface, as determined by the Engineer, shall be repaired by the Contractor, at the Contractor's expense, by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Except as approved by the Engineer, a minimum curing time of 72 hours shall be allowed between application of inorganic zinc coating and water rinsing.

Exposed areas of inorganic zinc coating, where finish coats are specified, shall be thoroughly water rinsed.

The final coat of inorganic zinc coating shall be applied after testing for adhesion, testing for cure, and completion of all operations that may damage or discolor the steel surface, including correction of runs, sags, thin and excessively thick areas in the paint film, skips and holidays, dry spray, or areas of non-uniform appearance.

The area to receive the final coat of inorganic zinc coating shall be lightly roughened by abrasive blasting using an abrasive no larger than 30 mesh. Abrasive blasting shall remove no more than 0.5 mil of inorganic zinc. The surface to be lightly roughened shall be free from moisture, dust, grease or any deleterious material. The undercoated areas of column casing surfaces not receiving a final coat shall be protected from abrasive blast cleaning operations.

The final coat of inorganic zinc coating shall be applied to the required dry film thickness in one uniform application within 24 hours after light roughening. The dry film thickness of the final coat of inorganic zinc coating shall be not less than 1 mil nor more than 3 mils.

The total dry film thickness of all applications of the single undercoat and final coat of inorganic zinc coating shall be not less than 5 mils nor more than 11 mils.

Finish coats will not be required.

GROUTING.--Grouting shall conform to the provisions in Section 50-1.09, "Bonding and Grouting," of the Standard Specifications and these special provisions.

For non-circular columns where the minimum gap to be filled with grout is one inch and the maximum gap is greater than 4 inches, aggregate shall be used to extend the grout, but only to the extent that the cement content of the grout is not less than 846 pounds per cubic yard of grout. California Test 541 will not be required nor will the grout be required to pass through a screen with a 0.07-inch maximum clear opening prior to being introduced into the grout pump. Aggregate shall consist of at least 70 percent fine aggregate and approximately 30 percent pea gravel, by weight. Fine aggregate shall conform to the provisions in Section 90-2, "Materials," of the Standard Specifications. The size of pea gravel shall be such that 100 percent passes the 1/2 inch screen, a minimum 90 percent passes the 3/8 inch screen and not more than 5 percent passes the No. 8 screen.

The Contractor shall limit the height of each lift of grout to minimize undulations and displacements of the surface of the shell during grouting. Undulations in the shell surface, including undulations from fabrication and erection, shall not exceed 1/4 inch per foot nor shall the total displacement from plan location exceed 2 inches at any point. At the Contractor's option, a bracing system or other means may be employed to restrain the casing within the specified tolerances. Except where shown on the plans, restraints shall not pass through the columns. The grout shall harden prior to placing the next lift of grout, unless a bracing system is used.

Suitable external grout injection valves shall be installed for filling of the casings. The filling operation shall begin at the bottom of the casing. Spacing of the valves shall be such that the grout will fill the gap between the casing and the column.

Casings shall be sealed at the bottom. Grout shall be pumped into the casing such that the grout head is maintained uniformly around the column, and no visible evidence of water or air is ejected at the top of the grout. The grout at the casing top shall be covered with mortar and sloped to drain. Mortar shall conform to the provisions in Section 51-1.135, "Mortar," of the Standard Specifications.

Casings shall be positioned with spacers to center the casing around the existing column at the location shown on the plans. Spacers may be welded to the inside of the casing.

Grout shall not be permitted to flow across shoulders or lanes occupied by public traffic, or to flow into gutters or other drainage facilities.

Clamps, valves, injection ports, lifting ears and other accessories shall be completely removed not less than 24-hours after placing grout. Voids shall be filled with mortar and finished flush with the exterior surface of the casing.

MEASUREMENT AND PAYMENT.--Column casings will be measured and paid for in conformance with the provisions in Section 55-4.01, "Measurement," of the Standard Specifications and these special provisions.

The contract price paid per pound for column casing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in column casings filled with grout, complete in place, including cleaning and painting of structural steel, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.65 SIGN STRUCTURES

Sign structures and foundations for overhead signs shall conform to the provisions in Section 56-1, "Overhead Sign Structures," of the Standard Specifications and these special provisions.

Bolts, nuts and washers for use in sign structures shall conform to the following:

Material	Specification
Steel fastener components for general applications:	
Bolts and studs	ASTM: A 307
Headed anchor bolts	ASTM: A 307, Grade B, including S1 supplementary requirements
Nonheaded anchor bolts	ASTM: A 307, Grade C, including S1 supplementary requirements and S1.6 of AASHTO: M 314 supplementary requirements or AASHTO: M 314, Grade 36 or 55, including S1 supplementary requirements.
High-strength bolts and studs	ASTM: A 449, Type 1
High-strength threaded rods	ASTM: A 449, Type 1
High-strength nonheaded anchor bolts	ASTM: A 449, Type 1
Nuts	ASTM: A 563, including Appendix X1 ^a
Washers	ASTM: F 844

- b. Zinc-coated nuts that will be tightened beyond snug or wrench tight shall be furnished with a dry lubricant conforming to Supplementary Requirement S2 in ASTM Designation: A 563.

Delete the eleventh paragraph of Section 56-1.03, "Fabrication," of the Standard Specifications.

Ribbed sheet metal panels for box beam-closed truss sign structures shall be fastened to the truss members by bolts as shown on the plans, or by stainless steel blind rivets conforming to Industrial Fasteners Institute, Standard IFI-114, Grade 51. The outside diameter of the rivet body shall be domed and shall be not less than 5/8 inch in diameter. Web splices in ribbed sheet metal panels may be made with similar type blind rivets of a size suitable for the thickness of material being connected.

Delete Section 56-1.04, "Welding," of the Standard Specifications.

Welding, nondestructive testing of welds, and acceptance and repair criteria for nondestructive testing of welds on steel overhead sign structure members shall conform to the requirements of AWS D1.1 and these special provisions.

Before commencing fabrication of sign structures, the Contractor shall submit 2 sets of working drawings to the Engineer in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings." The working drawings shall include sign panel dimensions, span lengths, post heights, anchorage layouts, proposed splice locations, a snugging and tensioning pattern for anchor bolts and high strength bolted connections, and details for permanent steel anchor bolt templates. The working drawings shall be supplemented with a written quality control program that includes methods, equipment, and personnel necessary to satisfy the requirements specified herein and in the special provisions.

Working drawings shall be 22 inches x 34 inches or 11 inches x 17 inches in size and each drawing and calculation sheet shall include the State assigned designations for the contract number, sign structure type and reference as shown on the contract plans, District-County-Route-Post Mile, and contract number.

The Engineer shall have 20 working days to review the sign structure working drawings after a complete submittal has been received. No fabrication or installation of sign structures shall be performed until the working drawings are approved in writing by the Engineer.

Should the Engineer fail to complete the review within the time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the sign structure working drawings, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays."

A permanent steel template shall be used to maintain the proper anchor bolt spacing.

One top nut, one leveling nut, and 2 washers shall be provided for the upper threaded portion of each anchor bolt.

Add the following 2 paragraphs after the third paragraph of Section 56-1.03, "Fabrication," of the Standard Specifications:

Surfaces of base plates which are to come in contact with concrete, grout, or washers and leveling nuts shall be flat to within 0.10 inch tolerance in 12 inches, and to within 0.20 inches tolerance overall. Faying surfaces of plates in high-strength bolted connections including flange surfaces of field splices, chord joints, and frame junctures, and contact surfaces of plates used for breakaway slip base assemblies shall be flat to within 0.080 inches tolerance in 12 inches, and within 0.10 inch tolerance overall.

Thermally cut holes made in tubular members of sign supports, other than holes in base and flange plates, shall initially be made a minimum of 0.080 inches undersized, and then be mechanically enlarged by reaming or grinding to the final required size and shape. All edges shall have a surface roughness of not greater than 250 micro inches. Round holes may be drilled to the exact final diameter. No holes shall be made in members unless the holes are shown on the plans or are approved in writing by the Engineer.

The sixth through the thirteenth paragraphs in Section 56-1.03, "Fabrication," of the Standard Specifications are amended to read:

High-strength bolted connections, where shown on the plans, shall conform to the provisions in Section 55-3.14, "Bolted Connections," except that only fastener assemblies consisting of a high-strength bolt, nut, hardened washer and direct tension indicator shall be used.

High-strength fastener assemblies, and any other bolts, nuts, and washers attached to sign structures shall be zinc-coated by the mechanical deposition process.

An alternating snugging and tensioning pattern for anchor bolts and high-strength bolted splices shall be used. Once tensioned, high-strength fastener components and direct tension indicators shall not be reused.

For bolt diameters less than 0.40 inches, the diameter of the bolt hole shall be not more than 0.030 inches larger than the nominal bolt diameter. For bolt diameters greater than or equal to 0.40 inches, the diameter of the bolt hole shall be not more than 0.060 inches larger than the nominal bolt diameter.

Sign structures shall be fabricated into the largest practical sections prior to galvanizing.

Ribbed sheet metal panels for box beam closed truss sign structures shall be fastened to the truss members by cap screws or bolts as shown on the plans, or by 3/16 inch stainless steel blind rivets conforming to Industrial Fasteners Institute, Standard IFI-114, Grade 51. The outside diameter of the large flange rivet head shall be not less than 5/8 inch in diameter. Web splices in ribbed sheet metal panels may be made with similar type blind rivets of a size suitable for the thickness of material being connected.

Spalling or chipping of concrete structures shall be repaired by the Contractor at the Contractor's expense.

Overhead sign supports shall have an aluminum identification plate permanently attached near the base, adjacent to the traffic side on one of the vertical posts, using either stainless steel rivets or stainless steel screws. As a minimum, the information on the plate shall include the name of the manufacturer, the date of manufacture and the contract number.

Steel members used for overhead sign structures shall receive nondestructive testing (NDT) in conformance with AWS D1.1 and the following:

A.

Weld Location	Weld Type	Minimum Required NDT
Welds for butt joint welds in tubular sections, nontubular sections, and posts	CJP groove weld with backing ring	100% UT or RT
Longitudinal seam welds*	PJP groove weld	25% MT
	CJP groove weld	100% UT or RT
Welds for base plate, flange plate, or end cap to post or mast arm	CJP groove weld	25% UT or RT
	Fillet weld	25% MT
* Longitudinal seam welds shall have 60% minimum penetration, except that within 6 inches of any circumferential weld, longitudinal seam welds shall be CJP groove welds.		

- B. A written procedure approved by the engineer shall be used when performing UT on material less than 0.31 inches thick. Contoured shoes shall be used when performing UT on round tubular sections under 50 inches in diameter.
- C. When less than 100 percent of a weld is specified for NDT, and if defects are found during this inspection, additional NDT shall be performed. This additional NDT shall be performed on 25 percent of the total weld for all similar welds, as determined by the Engineer, produced for sign structures in the project. If any portion of the additional weld inspected is found defective, 100 percent of all similar welds produced for sign structures in the project, as determined by the Engineer, shall be tested.

Circumferential welds and base plate to post welds may be repaired only one time without written permission from the Engineer.

All ferrous metal parts of tubular sign structures shall be galvanized and shall not be painted.

Full compensation for furnishing anchor bolt templates and for testing of welds shall be considered as included in the contract price paid per pound for furnish sign structure of the types listed in the Engineer's estimate and no additional compensation will be allowed therefor.

10-1.66 ROADSIDE SIGNS

Roadside signs shall be installed at the locations shown on the plans or where designated by the Engineer and in conformance with the provisions in Section 56-2, "Roadside Signs," of the Standard Specifications and these special provisions.

Delete Section 56-1.02C, "Bolts, Nuts, and Washers," of the Standard Specifications.

Bolts, nuts, and washers for use in sign structures shall conform to the provisions in "Sign Structures," of these special provisions.

Delete the first three paragraphs of Section 56-2.02B, "Wood Posts," of the Standard Specifications.

The grades and species allowed for wood posts, 4" by 4" nominal size, are select heart redwood; No. 1 heart structural redwood (1050f); No. 2 heart structural redwood (900f); No. 1 structural light framing Douglas fir, free of heart center; No. 1 structural light framing Hem-Fir, free of heart center; or No. 1 structural light framing Southern yellow pine, free of heart center. The grades and species allowed for wood posts, 4" by 6" nominal size, are select heart grade redwood; select heart structural grade redwood (1100f); No. 1 heart structural redwood (950f); No. 2 structural joists and planks, Douglas fir, free of heart center; No. 1 structural joists and planks Hem-Fir, free of heart center; or No. 2 structural joists and planks Southern yellow pine. The grades and species allowed for wood posts larger than 4" by 6" nominal size are select heart redwood; No. 1 heart structural redwood (950f); No. 1 posts and timbers (also known as No. 1 structural) Douglas fir, free of heart center; select structural posts and timbers Hem-Fir, free of heart center; or No. 1 timbers Southern yellow pine, free of heart center.

Posts shall be graded in conformance with the provisions in Section 57-2, "Structural Timber." Sweep shall not exceed 0.08 foot in 10 feet.

Before preservative treatment, the moisture content of Douglas fir, Hem-Fir, and Southern yellow pine posts shall be not more than 25 percent as measured at the midpoint of the post in the outer inch, using an approved type of moisture meter, in conformance with the requirements of ASTM Designation: D 4444.

Wood posts shall be pressure treated after fabrication in conformance with the provisions in Section 58, "Preservative Treatment of Lumber, Timber and Piling," of the Standard Specifications with creosote, creosote coal tar solution, creosote petroleum solution (50-50), pentachlorophenol in hydrocarbon solvent, copper naphthenate, ammoniacal copper arsenate, or ammoniacal copper zinc arsenate. In addition to the preservatives listed above, Southern yellow pine may also be pressure treated with chromated copper arsenate. When other than one of the creosote processes is used, blocks shall have a minimum retention of 0.4 pounds per cubic foot, and need not be incised.

Type N, Type P, and Type R marker panels mounted on a post with a roadside sign shall be considered to be sign panels and will not be paid for as markers.

Metal (barrier mounted sign), metal (wall mounted flush sign), metal (concrete barrier mounted flush sign) and metal (wall mounted sign) will be measured and paid for in the same manner as metal (rail mounted sign).

10-1.67 INSTALL SIGN OVERLAY

Sign overlays shall be installed on existing signs as shown on the plans and in conformance with these special provisions.

Sign overlay panels will be furnished by the State as provided under "Materials" of these special provisions.

Self plugging blind rivets for installing sign overlays shall have a 3/16" x 5/8" shank. A number 10 drill shall be used for drilling the rivet holes. If the overlay is not pre-punched, maximum rivet spacing shall be 16 inches.

Install sign overlay will be measured by the square foot.

The contract price paid per square foot for install sign overlay shall include full compensation for furnishing all labor, materials (except sign overlays), tools, equipment, and incidentals, and for doing all the work involved in installing sign overlay panels on existing signs (including fastening hardware), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.68 CLEAN AND PAINT STRUCTURAL STEEL

Exposed new metal surfaces and connections to existing steel, except where galvanized, shall be cleaned and painted in conformance with the provisions in Sections 59-2, "Painting Structural Steel," and 91, "Paint," of the Standard Specifications and these special provisions.

Whenever the Standard Specifications refer to "Steel Structures Painting Council," the reference shall be replaced with "SSPC: The Society for Protective Coatings."

The fifth paragraph in Section 59-1.03, "Application," of the Standard Specifications is amended to read:

Unless otherwise specified, should 7 days elapse between paint applications, the painted surface shall be water rinsed prior to the next paint application. Water rinsing shall be defined as a pressurized water rinse with a minimum nozzle pressure of 1200 psi. During rinsing, the tip of the pressure nozzle shall be placed between 12 and 18 inches from the surface to be rinsed. The nozzle shall have a 30° fan tip maximum.

The ninth paragraph in Section 59-1.03, "Application," of the Standard Specifications is amended to read:

Runs, sags, thin and excessively thick areas in the paint film, skips and holidays, or areas of non-uniform appearance shall be considered as evidence that the work is unsatisfactory, and the Contractor may be required to blast clean the areas and reapply the paint.

Section 59-2.01, "General," of the Standard Specifications is amended by adding the following paragraphs after the first paragraph:

Unless otherwise specified, no painting Contractors or subcontractors will be permitted to commence work without having the following current "SSPC: The Society for Protective Coatings" (formerly the Steel Structures Painting Council) certifications in good standing:

- A. For cleaning and painting structural steel in the field, certification in conformance with the requirements in Qualification Procedure No. 1, "Standard Procedure For Evaluating Painting Contractors (Field Application to Complex Industrial Structures)" (SSPC-QP 1).
- B. For removing paint from structural steel, certification in conformance with the requirements in Qualification Procedure No. 2, "Standard Procedure For Evaluating Painting Contractors (Field Removal of Hazardous Coatings from Complex Structures)" (SSPC-QP 2).
- C. For cleaning and painting structural steel in a permanent painting facility, certification in conformance with the requirements in Qualification Procedure No. 3, "Standard Procedure For Evaluating Qualifications of Shop Painting Applicators" (SSPC-QP 3). The AISC's Sophisticated Paint Endorsement (SPE) quality program will be considered equivalent to SSPC-QP 3.

The third paragraph in Section 59-2.03, "Blast Cleaning," of the Standard Specifications is amended to read:

Exposed steel or other metal surfaces to be blast cleaned shall be cleaned in conformance with the requirements in Surface Preparation Specification No. 6, "Commercial Blast Cleaning," of the "SSPC: The Society for Protective Coatings." Blast cleaning shall leave all surfaces with a dense, uniform, angular anchor pattern of not less than 1 1/2 mils as measured in conformance with the requirements of ASTM Designation: D 4417.

Section 59-2.04, "Pre-Treatment," of the Standard Specifications is deleted.

The first paragraph in Section 59-2.05, "Steam Cleaning," of the Standard Specifications is amended to read:

All dirt, grease, loose chalky paint or other foreign material which has accumulated on the previously painted or galvanized surfaces shall be removed with a steam cleaning apparatus which shall precede all other phases of cleaning. The temperature of the steam produced by the steam cleaning apparatus shall be between 266° F and 374° F at the nozzle. Gloss on the existing paint shall be removed without removing sound paint. Areas of gloss on the existing paint that are not removable by steam cleaning and rising shall be lightly roughened by sanding with 100- to 200-grit

sandpaper. Any paint which becomes loose, curled, lifted, or loses its bond with the preceding coat or coats after steam cleaning, shall be removed to sound paint or metal surface by the Contractor at the Contractor's expense.

The third paragraph in Section 59-2.05, "Steam Cleaning," of the Standard Specifications is amended to read:

Steam cleaned surfaces shall be rinsed clean with fresh water to remove any residue, detergent or other foreign material.

The first paragraph in Section 59-2.06, "Hand Cleaning," of the Standard Specifications is amended to read:

Dirt, loose rust and mill scale, or paint which is not firmly bonded to the surfaces shall be removed in conformance with the requirements in Surface Preparation Specification No. 2, Hand Tool Cleaning," of the "SSPC: The Society for Protective Coatings." Edges of old remaining paint shall be feathered.

The first subparagraph of the first paragraph in Section 59-2.12, "Painting," of the Standard Specifications is amended to read:

Structures, other than sign structures, shall be blast cleaned and painted with the total thickness of undercoats before erection. Finish coats and final coats shall be applied after erection. If concrete deck is to be placed on a steel member to be painted, finish coats and final coats shall be applied after concrete deck placement. After erection and deck placement, before applying subsequent paint, areas where paint has been damaged or has deteriorated and exposed unpainted surfaces shall be thoroughly cleaned, including removal of foreign substances, and surfaces shall be spot painted with undercoats to the specified thickness. Damaged areas of undercoat paint shall be blast cleaned and painted as specified in the special provisions.

The third paragraph in Section 59-2.12, "Painting," of the Standard Specifications is amended to read:

Contact surfaces of stiffeners, railings, built up members, or any open seam exceeding 6 mils in width that would retain moisture shall be caulked with non-silicone type sealing compound conforming to the requirements in Federal Specification TT-S-230, Type II, or other approved material. The sealing compound shall be applied no sooner than 72 hours after the last application of undercoat, unless otherwise revised in writing by the Engineer. The sealing compound shall be allowed to cure as recommended by the manufacturer prior to rinsing and the application of the first finish coat. When no finish coats are applied, the sealing compound shall be gray in color.

The fourth paragraph in Section 59-2.12, "Painting," of the Standard Specifications is amended to read:

The dry film thickness of the paint will be measured in place with a calibrated Type 2 magnetic film thickness gauge in conformance with the requirements of Specification SSPC-PA2 of the "SSPC: The Society for Protective Coatings."

The first paragraph in Section 59-2.15, "Machinery," of the Standard Specifications is amended to read:

Prior to installation, all surfaces of machinery exposed to the atmosphere shall be painted with 2 applications of unthinned zinc-rich primer (organic vehicle type) conforming to the provisions in Section 91, "Paint." Unless otherwise specified in the special provisions, the exposed surfaces shall be painted after installation with 2 finish applications of commercial quality gray gloss enamel. Aerosol cans shall not be used.

The first paragraph in Section 59-3.03, "Painting," of the Standard Specifications is deleted.

The second paragraph in Section 59-3.03, "Painting," of the Standard Specifications is amended to read:

Galvanized surfaces shall be covered with 2 separate applications of finish coats as specified in the special provisions. Paint for the first application shall be tinted by the manufacturer to slightly contrast with the color of the second application.

Prior to performing any painting or paint removal, the Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 3 copies of a separate Painting Quality Work Plan (PQWP) for each item of work for which painting or paint removal is to be performed. As a minimum, each PQWP shall include the following:

- A. The name of each Contractor or subcontractor to be used.
 - B. One copy each of all current "SSPC: The Society for Protective Coatings" specifications or qualification procedures which are applicable to the painting or paint removal to be performed. These documents shall become the permanent property of the Department.
 - C. Proposed methods and equipment to be used for any paint application.
 - D. Proof of each of any required certifications, SSPC-QP 1, SSPC-QP 2, SSPC-QP 3.
1. In lieu of certification in conformance with the requirements in SSPC-QP 1, the Contractor may submit written documentation showing conformance with the requirements in Section 3, "General Qualification Requirements," of SSPC-QP 1.
 2. In lieu of certification in conformance with the requirements in SSPC-QP 2, the Contractor may submit written documentation showing conformance with the requirements in Sections 4.2 through 4.6 of SSPC-QP 2.

The Engineer shall have 10 working days to review the PQWP submittal after a complete plan has been received. No painting or paint removal shall be performed until the PQWP for that work is reviewed by the Engineer. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the PQWP, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

It is expressly understood that the Engineer's review of the Contractor's PQWP shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work in conformity with the requirements of the plans and specifications. The Engineer's review shall not constitute a waiver of any of the requirements of the plans and specifications nor relieve the Contractor of any obligation thereunder, and defective work, materials, and equipment may be rejected notwithstanding review of the PQWP.

The existing paint systems consist of materials listed in "Existing Highway Facilities" of these special provisions.

CLEANING.--Exposed new metal surfaces and where welding new stiffener plates to existing steel girders at the East El Monte Overhead (Widening), except where galvanized, shall be dry blast cleaned and dry spot blast cleaned, respectively, in conformance with the requirements in Surface Preparation Specification No. 10, "Near White Blast Cleaning," of the "SSPC: The Society for Protective Coatings." Blast cleaning shall leave surfaces with a dense, uniform, angular, anchor pattern of no less than 1 1/2 mils nor more than 3 1/2 mils as measured in conformance with the requirements in ASTM Designation: D 4417.

The areas of connections to existing steel to be dry spot blast cleaned shall consist of areas of existing steel within a 4-inch radius measured in any direction from the point of application of heat for welding or flame cutting.

Mineral and slag abrasives used for blast cleaning existing steel shall conform to the requirements of Abrasive Specification No. 1, "Mineral and Slag Abrasives," of the "SSPC: The Society for Protective Coatings" and shall not contain hazardous material. Mineral and slag abrasives shall comply with the requirements for Class A, Grade 2 to 3 as defined therein.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications and a Material Safety Data Sheet shall be furnished prior to use for each shipment of blast cleaning material for existing steel.

PAINTING.--Blast cleaned surfaces shall receive a single undercoat consisting of a waterborne inorganic zinc coating conforming to the requirements in AASHTO Designation M 300, Type II, except that 1) the first 3 sentences of Section 4.7, "Primer Field Performance Requirements," and the entire Section 4.7.1 shall not apply, and 2) zinc dust shall be Type II in conformance with the requirements in ASTM Designation: D520. The inorganic zinc coating shall be listed on the qualified products list which may be obtained from the Transportation Laboratory.

Inorganic zinc coating shall be used within 12 hours of initial mixing.

Application of inorganic zinc coating shall conform to provisions for applying zinc-rich coating in Section 59-2.13, "Application of Zinc-Rich Primer," of the Standard Specifications.

Inorganic zinc coating shall not be applied when the atmospheric or surface temperature is less than 45° F nor more than 85° F nor when the relative humidity exceeds 85 percent.

The single undercoat of inorganic zinc coating shall be applied to the required dry film thickness in 2 or more applications within 4 hours after blast cleaning.

The total dry film thickness of all applications of the inorganic zinc undercoat, including the surfaces of outside existing members within the grip under bolt heads, nuts, and washers, shall be not less than 4 mils nor more than 8 mils, except that the total dry film thickness on each faying (contact) surface of high strength bolted connections, shall be between 1 mil and the maximum allowable dry film thickness for Class B coatings as determined by certified testing in conformance with Appendix A of the "Specification for Structural Joints Using ASTM A325 or A490 Bolts" of the Research Council on

Structural Connections (RCSC Specification). Unless otherwise stated, all inorganic zinc coatings used on faying surfaces shall meet the slip coefficient requirements for a Class B coating on blast-cleaned steel, as specified in the RCSC Specification. The Contractor shall provide results of certified testing showing the maximum allowable dry film thickness for the Class B coating from the qualifying tests for the coating he has chosen, and shall maintain the coating thickness on actual faying surfaces of the structure at or below this maximum allowable coating thickness.

Areas where mudcracking occurs in the inorganic zinc coating shall be blast cleaned and repainted with inorganic zinc coating to the specified thickness.

Dry spray, or overspray, as defined in the Steel Structures Painting Manual, Volume 1, "Good Painting Practice," of the "SSPC: The Society for Protective Coatings", shall be removed prior to application of subsequent coats or final acceptance. Removal of dry spray shall be by screening or other methods that minimize polishing of the inorganic zinc surface. The dry film thickness of the coating after removal of dry spray shall be in conformance with the provisions for applying the single undercoat, as specified herein.

The inorganic zinc coating shall be tested for adhesion and cure. The locations of the tests will be determined by the Engineer. The sequence of the testing operations shall be determined by the Contractor. The testing for adhesion and cure will be performed no sooner than 72 hours after application of the single undercoat of inorganic zinc coating. At the Contractor's expense, satisfactory access shall be provided to allow the Engineer to determine the location of the tests and to test the inorganic zinc coating cure. The inorganic zinc coating shall pass the following tests:

Adhesion.--The inorganic zinc coating shall have a minimum adhesion to steel of 600 psi when measured at no more than 6 locations per span on each girder using a self-aligning adhesion tester in conformance with the requirements in ASTM Designation: D 4541. The Contractor, at the Contractor's expense, shall: (1) verify compliance with the adhesion requirements, (2) furnish test results to the Engineer, and (3) repair the coating after testing.

Cure.--The inorganic zinc coating, when properly cured, shall exhibit a solid, hard and polished metal surface when firmly scraped with the knurled edge of a quarter. Inorganic zinc coating that is powdery, soft or does not exhibit a polished metal surface, as determined by the Engineer, shall be repaired by the Contractor, at the Contractor's expense, by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

The surface pH of the inorganic zinc primer shall be checked in conformance with ASTM Designation: D 4262 by wetting the surface with de-ionized water and applying pH paper with a capability of measuring in increments of 0.5 pH units. Application of finish coats will not be permitted until the surface pH is less than 8.

Except as approved by the Engineer, a minimum curing time of 72 hours shall be allowed between application of inorganic zinc coating and water rinsing.

Exposed areas of inorganic zinc coating shall be thoroughly water-rinsed.

Exposed areas of inorganic zinc coating shall receive a minimum of 2 finish coats of an exterior grade latex paint supplied by the manufacturer of the inorganic zinc coating.

The first finish coat shall be applied within 48 hours following the water rinsing.

The finish coat paint shall be formulated for application to inorganic zinc coating and shall conform to the following provisions:

A.

Property	Value	ASTM Designation
Pigment content, percent	24 max.	D 3723
Nonvolatile content, mass percent	49 min.	D 2369
Consistency, KU	75 min. to 90 max.	D 562
Fineness of dispersion, Hegman	6 min.	D 1210
Drying time at 77°F, 50% RH, 4 mil wet film		D 1640
Set to touch, minutes	30 max.	
Dry through, hours	1 max.	
Adhesion	4A	D 3359, Procedure A

B. No visible color change in the finish coats shall occur when tested in conformance with the requirements of ASTM Designation: G 53 using FS 40 UV-B bulbs for a minimum of 38 cycles. The cycle shall be 4 hours of ultraviolet (UV) exposure at 140° F and 4 hours of condensate exposure at 104° F.

C. The vehicle shall be an acrylic or modified acrylic copolymer with a minimum of necessary additives.

The first finish coat shall be applied in 2 applications. The first application shall consist of a spray applied mist application. The second application shall be applied after the mist application has dried to a set to touch condition as determined by the procedure described in Section 7 of ASTM Designation: D1640. The first finish coat color shall match Federal Standard 595B No. 26408. The total dry film thickness of both applications of the first finish coat shall be not less than 2 mils.

Except as approved by the Engineer, a minimum drying time of 12 hours shall be allowed between finish coats.

The second finish coat color shall match Federal Standard 595B No. 26408. The total dry film thickness of all applications of the second finish coat shall be not less than 2 mils.

The 2 finish coats shall be applied in 3 or more applications to a total dry film thickness of not less than 4 mils nor more than 8 mils.

The total dry film thickness of all applications of inorganic zinc coating and finish coat paint shall be not less than 8 mils nor more than 14 mils.

Cleaning and painting of existing contact surfaces of high strength bolted connections that contain rust, loose paint or other foreign substances, except loose dirt and dust, will be considered as extra work as specified in Section 4-1.03D of the Standard Specifications. Cost of repair of damage to existing paint caused by the Contractor's operations shall be borne by the Contractor.

MEASUREMENT AND PAYMENT.--Full compensation for dry spot blast cleaning and undercoat painting of blast cleaned areas of existing surfaces shall be considered as included in the contract lump sum price paid for clean and paint structural steel and no separate payment will be made.

The contract lump sum price paid for clean and paint structural steel shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in cleaning and painting the exposed surfaces of the new structural steel and finish coat on undercoated areas of existing metal, complete in place, including water rinsing, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.69 REINFORCED CONCRETE PIPE

Reinforced concrete pipe shall conform to the provisions in Section 65, "Reinforced Concrete Pipe," of the Standard Specifications and these special provisions.

Delete the fifth paragraph of Section 65-1.02A(2), "Circular Reinforced Concrete Pipe (Direct Design Method)," of the Standard Specifications.

Shop plans shall conform to the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, and shall be submitted to the Engineer for approval. For initial review, 3 sets shall be submitted to the Office of Structure Design. After review, 6 sets shall be submitted to that Office for final approval and for use during construction.

Where embankment will not be placed over the top of the pipe, a relative compaction of not less than 85 percent shall be required below the pipe spring line for pipe installed using Method 1 backfill in trench, as shown on the plans. Where the pipe is to be placed under the traveled way, a relative compaction of not less than 90 percent shall be required unless the minimum distance between the top of the pipe and the pavement surface is the greater of 4 feet or one half of the outside diameter of the pipe.

Except as otherwise designated by classification on the plans or in the specifications, joints for culvert and drainage pipes shall conform to the plans or specifications for standard joints.

When reinforced concrete pipe is installed in conformance with the details shown on the plans, the fifth paragraph of Section 19-3.04, "Water Control and Foundation Treatment," of the Standard Specifications shall not apply.

When solid rock or other unyielding material is encountered at the planned elevation of the bottom of the bedding, the material below the bottom of the bedding shall be removed to a depth of 1/50 of the height of the embankment over the top of the culvert, but not less than 0.50 feet nor more than one foot. The resulting trench below the bottom of the bedding shall be backfilled with structure backfill material in conformance with the provisions in Section 19-3.06, "Structure Backfill," of the Standard Specifications.

The excavation and backfill below the planned elevation of the bottom of the bedding will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

The Outer Bedding shown on the plans shall not be compacted prior to placement of the pipe.

10-1.70 CORRUGATED METAL PIPE

Corrugated steel pipe and slotted corrugated steel pipe culverts shall conform to the provisions in Section 66, "Corrugated Metal Pipe," of the Standard Specifications and these special provisions.

Corrugated steel pipe shall be fabricated from zinc-coated steel sheet.

Delete the first paragraph in Section 66-1.03, "Protective Coatings, Linings and Pavings," of the Standard Specifications.

When required by these special provisions or designated in the Engineer's Estimate, pipes shall be protected with bituminous coating, bituminous lining or have the invert paved with bituminous material or coated with polymerized asphalt. Moisture, dirt, oil, unbonded or incompatible paint, grease, alkalies, or other foreign matter shall be removed from the surface to be coated before the coating material is applied.

Delete the sixth, seventh and eighth paragraphs in Section 66-1.03, "Protective Coatings, Linings and Pavings," of the Standard Specifications.

When linings and pavings are not required, an asphalt mastic coating may be substituted for the bituminous coating on corrugated steel pipe or a polymeric sheet coating may be substituted for bituminous coating on corrugated steel pipe. The asphalt mastic or polymeric sheet coating shall be placed on the outside surface of the pipe, and the insides need not be coated unless otherwise provided in these special provisions.

Asphalt mastic coating shall conform to the requirements in AASHTO Designation: M 243 except that asbestos fibers will not be required. The asphalt mastic material shall be applied uniformly to the surface with a minimum thickness of 0.05-inch at any point. Asphaltic mastic coating shall be applied at the fabrication plant. Any pinholes, blisters, cracks or lack of bond shall be cause for rejection.

Polymeric sheet coating shall conform to the requirements in AASHTO Designation: M 246/M 246M. The polymeric sheet coating shall be applied to the galvanized sheet prior to corrugating and, unless otherwise specified in the plans or these special provisions, the thickness shall be not less than 0.010-inch. Any pinholes, blisters, cracks or lack of bond shall be cause for rejection.

Polymerized asphalt invert coating shall be applied in conformance with the requirements in ASTM Designation: A 849 for "Invert Paved Type with Polymer Material (Class P)," except that polymerized asphalt coatings shall be applied by immersion to a minimum thickness of 0.05 inch above the crests and troughs of the corrugations of the interior and exterior invert including pipe ends. Polymerized asphalt material shall conform to the "Requirements for Polymer Coating" contained in ASTM Designation: A 742/A 742M, and the following:

Polymerized asphalt shall be hot-applied thermoplastic material containing a minimum of 7.0 percent styrene-butadiene-styrene block copolymer.

There shall be not more than 0.25 inch undercutting or delamination from the scribe when a minimum 12 inches by 12 inches coupon cut from the coated pipe is exposed for 1000 hours in conformance with the requirements in ASTM Designation: B 117. Cut edges shall be sealed by dipping in a sample of the polymerized asphalt coating heated to the manufacturer's recommended application temperature. There shall be no corrosion or delamination from the sealed edges following exposure as specified.

Delete the second paragraph of Section 66-2.03B, "Fabrication by Continuous Helical Lock Seam," of the Standard Specifications.

Delete the last paragraph of Section 66-2.03B, "Fabrication by Continuous Helical Lock Seam," of the Standard Specifications.

Sampling and testing for continuous lock seam quality control shall conform to the requirements in California Test 662.

Delete the last paragraph in Section 66-1.03, "Protective Coatings, Linings and Pavings," of the Standard Specifications.

Damaged protective coatings, linings and invert paving shall be repaired by the Contractor at the Contractor's expense. Bituminous material conforming to the requirements in AASHTO Designation: M 190 or other materials approved by the Engineer shall be used to repair damaged bituminous coatings; asphalt mastic material conforming to the requirements in AASHTO Designation: M 243 shall be used to repair damaged asphalt mastic coatings; and tar base material conforming to the requirements in AASHTO Designation: M 243 shall be used to repair damaged polymeric sheet coatings. The repair of damaged polymerized asphalt coatings shall conform to the requirements in ASTM Designation: A 762, Section 11, "Repair of Damaged Coatings."

Section 66-3.06, "Damaged Aluminum Coatings," of the Standard Specifications.

In lieu of the requirements in AASHTO Designation: M 36/M 36M, damaged aluminum coatings shall be repaired as provided for damaged galvanizing in Section 75-1.05, "Galvanizing," or Section 66-3.05, "Damaged Galvanizing," of the Standard Specifications.

10-1.71 EDGE DRAINS

Edge drains shall conform to the requirements in Section 68-3, "Edge Drains," of the Standard Specifications.

10-1.72 UNDERDRAINS

Underdrains at bridge abutments and wing walls shall conform to the provisions in Section 68-1, "Underdrains," of the Standard Specifications and these special provisions.

Attention is directed to the section, "Engineering Fabrics," of these special provisions.

Permeable material used at bridge abutments and wing walls shall be placed in horizontal layers and thoroughly consolidated along with and by the same methods specified for structure backfill in Section 19-3, "Structure Excavation and Backfill," of the Standard Specifications. Ponding and jetting of permeable material or structure backfill adjacent to permeable material will not be permitted.

At the option of the Contractor, Class 1 or Class 2 permeable material shall be used. Filter fabric shall be placed between Class 1 permeable material and backfill or soil. No filter fabric will be required with Class 2 permeable material.

At the option of the Contractor, permeable material may be substituted for structure backfill material when the required width of backfill material adjacent to the neat lines of the permeable material as shown on the plans is approximately one foot or less. The quantity of permeable material substituted for structure backfill material will be measured and paid for as structure backfill (Bridge).

Full compensation for underdrains used at bridge abutments and wing walls shall be considered as included in the contract price paid for structure backfill (bridge), and no additional compensation will be allowed therefor. Full compensation for underdrains used at the right widening of the Garvey Avenue Off-Ramp Undercrossing (Widen), Bridge Number 53-1032, shall be considered as included in the contract price paid for Drainage System (Bridge), and no additional compensation will be allowed therefor.

Full compensation for permeable material used at bridge abutments and wing walls shall be considered as included in the contract price paid for structure backfill (bridge), and no additional compensation will be allowed therefor. Full compensation for permeable material used at the right widening of the Garvey Avenue Off-Ramp Undercrossing (Widen), Bridge Number 53-1032, shall be considered as included in the contract price paid for Drainage System (Bridge), and no additional compensation will be allowed therefor.

Full compensation for filter fabric used at bridge abutments and wing walls shall be considered as included in the contract price paid for structure backfill (bridge), and no additional compensation will be allowed therefor. Full compensation for filter fabric used at the right widening of the Garvey Avenue Off-Ramp Undercrossing (Widen), Bridge Number 53-1032, shall be considered as included in the contract price paid for Drainage System (Bridge), and no additional compensation will be allowed therefor.

10-1.73 DRAINAGE SYSTEM (BRIDGE)

Drainage system (bridge) at the right widening of the Garvey Avenue Off-Ramp Undercrossing (Widen), Bridge Number 53-1032, consisting of horizontal underdrains parallel to the transition slab and piping parallel to the abutment walls, shall conform to the provisions of the Standard Specifications and these special provisions.

Permeable material, engineering fabrics, and plastic pipe shall be as specified in these special provisions.

The contract lump sum price paid for drainage system (bridge) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in drainage system (bridge), complete in place, including furnishing and installing plastic pipe, filter fabric, treated permeable base, and drainage pad (minor concrete), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.74 OVERSIDE DRAINS

Steel entrance tapers, pipe downdrain anchor assemblies and corrugated steel pipe downdrains shall conform to the provisions in Section 69, "Overside Drains," of the Standard Specifications and these special provisions.

Steel entrance tapers and pipe downdrains shall be fabricated from zinc-coated steel sheet.

Plastic pipe for overside drains shall be Type S corrugated high density polyethylene or ribbed polyvinyl chloride pipe conforming to the provisions in Section 64, "Plastic Pipe," of the Standard Specification.

Plastic pipe joints shall conform to the provisions in Section 61-1.02, "Performance Requirements for Culvert and Drainage Pipe Joints," of the Standard Specifications for downdrain joints, except that the alternatives selected for plastic pipe joint restrainer assemblies shown on the plans shall serve in lieu of the tensile strength requirements. The joint overlap requirements for integral joints shall conform to the requirements for positive joints.

Plastic pipe joint restrainer assembly, Alternative A, when used shall be installed immediately below the pipe bell.

Polyvinyl chloride pipe shall not be used unless the overside drain is covered for the entire length of the overside drain.

Plastic pipe overside drains shall be installed with the bell end of the pipe facing uphill.

10-1.75 MISCELLANEOUS FACILITIES

Corrugated steel pipe risers, steel flared end sections, precast concrete pipe manholes and automatic drainage gates shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications and these special provisions.

Precast concrete pipe manholes shall be constructed to final grade until the paving or surfacing has been completed immediately adjacent to the manhole.

Precast concrete manhole reducers and grade rings will be measured by the linear foot and paid for as 36" precast concrete pipe manhole.

10-1.76 SLOPE PROTECTION

Slope protection shall conform to the provisions in Section 72, "Slope Protection," of the Standard Specifications and these special provisions.

Rock slope protection fabric shall be woven or nonwoven type fabric, Type A or Type B, at the option of the Contractor.

10-1.77 MISCELLANEOUS CONCRETE CONSTRUCTION

Curbs, gutters behind retaining walls, sidewalks and curb ramps shall conform to the provisions in Section 73, "Concrete Curbs and Sidewalks," of the Standard Specifications and these special provisions.

Curb ramp detectable warning surface shall conform to the details shown on the plans and shall not be constructed or installed on curb ramps with a slope that exceeds 6.67 percent. The finished surfaces of the detectable warning surface shall be free from blemishes.

Curb ramp detectable warning surface shall consist of raised truncated domes constructed or installed on curb ramps. The detectable warning surface, at the option of the Contractor, shall be either cast-in-place or stamped into the surface of the curb ramp, or shall be a prefabricated surface installed on the curb ramp. The color of the detectable warning surface shall be yellow conforming to Federal Standard No. 595B, Color No. 33538. Detectable warning surface, either in-place or stamped into the surface of the curb ramp, shall be painted yellow in conformance with the provisions in Section 59-6, "Painting Concrete," of the Standard Specifications.

Prior to constructing curb ramps with cast-in-place or stamped detectable warning surface, a test panel shall be constructed on the project site and shall be of a size not less than 2 feet by 2 feet. The test panel shall be constructed, finished and cured with the same materials, tools, equipment and methods to be used in constructing the proposed permanent work. Additional test panels shall be constructed as necessary until a panel is produced which demonstrates, to the satisfaction of the Engineer, the ability of the selected procedure to produce a detectable warning surface that meets all of the specified requirements.

Full compensation for constructing or installing curb ramp detectable warning surface shall be considered as included in the contract price paid per cubic yard for minor concrete (curb ramp) and no separate payment will be made therefor.

10-1.78 MISCELLANEOUS IRON AND STEEL

Miscellaneous iron and steel shall conform to the provisions in Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

Delete Section 75-1.02, "Miscellaneous Iron and Steel," of the Standard Specifications.

Miscellaneous iron and steel items shall conform to the dimensions and details shown on the plans and as specified in the Standard Specification and these special provisions.

At the option of the Contractor, grates shall be fabricated from either structural steel conforming to the requirements in ASTM Designations: A 36/A 37M or A 576 Grades 1021, 1022, 1026, 1029 or 1030, ductile iron castings, or carbon-steel castings.

Welding shall conform to the requirements in AWS D1.1.

Fabrication shall be performed in a workmanlike manner in conformance with the practice in modern commercial shops. Burrs, rough and sharp edges, and other flaws shall be removed. Warped pieces shall be straightened after all fabrication and galvanizing.

Raised pattern plates shall be of commercial quality.

Manhole frames and covers shall be fabricated from gray cast iron.

Unless otherwise specified, all steel items and cast iron lightweight sidewalk frames and covers shall be galvanized in conformance with the provisions in Section 75-1.05, "Galvanizing." Galvanizing shall be performed after fabrication and before assembling component parts. All other cast iron items shall be painted with or dipped in commercial quality asphaltum.

Drainage inlet frames and grates, except those which are to be on bridges, need not be galvanized or coated with asphalt paint.

Frames and grates, or frames and covers shall be matchmarked in pairs before delivery to the work and the grates and covers shall fit into their frames without rocking.

Unless otherwise specified, materials shall conform to the following specifications:

Material	Specification
Steel bars, plates and shapes	ASTM Designation: A 36/A 36M or A 575, A 576 (AISI or M Grades 1016 through 1030 except Grade 1017)
Steel fastener components for general applications: Bolts and studs Headed anchor bolts Nonheaded anchor bolts High-strength bolts and studs, threaded rods, and nonheaded anchor bolts Nuts Washers	ASTM Designation: A 307 ASTM Designation: A 307, Grade B, including S1 supplementary requirements ASTM Designation: A 307, Grade C, including S1 supplementary requirements and S1.6 of AASHTO Designation: M 314 supplementary requirements or ASSHTO Designation: M 314, Grade 36 or 55, including S1 supplementary requirements ASTM Designation: A 449, Type 1 ASTM Designation: A 563, including Appendix X1 ^a ASTM Designation: F 884
Components of high-strength steel fastener assemblies for use in structural steel joints: Bolts Tension control bolts Nuts Hardened washers Direct tension indicators	ASTM Designation: A 325, Type 1 ASTM Designation: F 1852, Type 1 ASTM Designation: A 563, including Appendix X1 ^a ASTM Designation: F 436, Type 1, Circular, including S1 supplementary requirements ASTM Designation: F 959, Type 325, zinc-coated
Stainless steel fasteners (Alloys 304 & 316) for general applications: Bolts, screws, nuts, studs, threaded rods and nonthreaded anchor bolts Washers	ASTM Designation: F 593 or F 738M ASTM Designation: A 240 and ANSI B 18.22M
Carbon-steel castings	ASTM Designation: A 27/A 27M, Grade 65-35 (450-240), Class 1
Malleable iron castings	ASTM Designation: A 47, Grade 32510 or A 47M
Gray iron castings	ASTM Designation: A 48, Class 30B
Ductile iron castings	ASTM Designation: A 536, Grade 65-45-12
Cast iron pipe	Commercial quality standard soil
Steel pipe	Commercial quality welded
Other parts for general applications	Commercial quality

^a Zinc-coated nuts that will be tightened beyond snug or wrench tight shall be furnished with a dry lubricant conforming to Supplementary Requirement S2 in ASTM Designation: A 563.

Delete the eighth, ninth and tenth paragraphs in Section 75-1.05, "Galvanizing," of the Standard Specifications.

Tapping nuts or other internally threaded parts to be used with zinc coated bolts, anchor bars or studs shall be done after galvanizing and shall conform to the requirements for thread dimensions and overtapping allowances in ASTM Designation: A 562 or A 563M.

When specified, painting of zinc coated surfaces shall be in accordance with the procedures in Section 59-3, "Painting Galvanized Surfaces," of the Standard Specifications.

Delete the second paragraph in Section 75-1.06, "Measurement," of the Standards Specifications.

Scale weightings will not be required when miscellaneous iron and steel, miscellaneous bridge metal, miscellaneous metal (restrainer), or pumping plant metal work are designated as final pay items in the Engineer's Estimate.

10-1.79 MISCELLANEOUS METAL (BRIDGE)

Miscellaneous metal (bridge) shall conform to the provisions for miscellaneous bridge metal in Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

Attention is directed to "Welding Quality Control" elsewhere in these special provisions.

Miscellaneous metal (bridge) shall consist of the miscellaneous bridge metal items listed in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications, and the following:

3/4-inch diameter tie rods

An approved thread locking system, consisting of a cleaner, primer and anaerobic adhesive, shall be applied where shown on the plans. Lubricants and foreign materials shall be removed from the threaded areas of both parts using the cleaner and small wire brush. The primer shall be applied to cover the threaded areas of both parts. The anaerobic adhesive shall be applied to fill the male threads in the area of the final position of the nut. The nut shall be installed at the location or to the torque shown on the plans, and an additional fillet of anaerobic adhesive shall be applied completely around the exposed junctions of the nut and male part. Full compensation for furnishing and applying the thread locking system shall be considered as included in the contract price paid for the item of work requiring the system and no separate payment will be made therefor.

The third subparagraph of the second paragraph of Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended to read:

3. Manhole frames and covers, frames and grates, ladder rungs, guard posts, and access door assemblies.

The third subparagraph of the eleventh paragraph of Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended to read:

Cast-in-place inserts shall be ferrule loop or cast iron type.

All metal parts of anchorage devices shall be fabricated from steel, except iron castings for cast-in-place inserts shall be malleable iron or ductile iron.

All metal parts of anchorage devices, except mechanical expansion anchors and iron castings for cast-in-place inserts, shall be hot-dip or mechanically galvanized. Mechanical expansion anchors may be hot-dip or mechanically galvanized, made from stainless steel, or coated with electrodeposited zinc conforming to the requirements of ASTM Designation: B 633. Iron castings shall be mechanically galvanized.

Scale weights will not be required when miscellaneous iron and steel, miscellaneous bridge metal, miscellaneous metal (restrainer), or pumping plant metal work are designated as final pay items in the Engineer's Estimate.

10-1.80 MISCELLANEOUS METAL (RESTRAINER-CABLE TYPE)

Miscellaneous metal (restrainer-cable type) shall conform to the provisions for bridge joint restrainer units in Section 75-1.035, "Bridge Joint Restrainer Units," of the Standard Specifications and these special provisions.

New concrete adjacent to restrainers shall be placed prior to installing restrainers.

Loose dirt and dust shall be washed from existing contact surfaces of high strength bolted connections without disturbing the existing paint. Full compensation for washing loose dirt and dust from existing contact surfaces of high strength bolted connections shall be considered as included in the contract price paid for the item of work requiring the washing and no separate payment will be made therefor.

Cleaning and painting of existing contact surfaces of high strength bolted connections that contain rust, loose paint or other foreign substances, except loose dirt and dust, will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications. Damage to existing paint caused by the Contractor's operations shall be repaired by the Contractor at the Contractor's expense.

An approved thread locking system, consisting of a cleaner, primer and anaerobic adhesive, shall be applied where shown on the plans. Lubricants and foreign materials shall be removed from the threaded areas of both parts using the cleaner and small wire brush. The primer shall be applied to cover the threaded areas of both parts. The anaerobic adhesive shall be applied to fill the male threads in the area of the final position of the nut. The nut shall be installed at the location or to the torque shown on the plans, and an additional fillet of anaerobic adhesive shall be applied completely around the exposed junctions of the nut and male part. Full compensation for furnishing and applying the thread locking system will be considered as included in the contract price paid for the item of work requiring the system and no separate payment will be made therefor.

The cable yield indicator shall be machined from hot-rolled bars of steel conforming to AISI Designation: C 1035 and shall be annealed, suitable for cold swaging. The heat number and manufacturer's identifying mark shall be stamped on the end surface of each cable yield indicator. The wall thickness of the reduced section of the cable yield indicator shall be machined by the Contractor so that the indicator yields at a load between 36.0 kips and 38.0 kips when tested in compression along the major axis at a test speed not to exceed one half inch per minute. Two certified copies of the mill test and heat treating reports of each heat of bars used for cable yield indicators shall be furnished to the Engineer.

The disc springs shall be made from steel conforming to the requirements in ASTM Designation: A 684/A 684M, Grade 1075. Galvanizing of the disc springs will not be required. The disc springs shall be cleaned and painted with a paint recommended by the manufacturer and color coded as shown on the plans.

The seventh subparagraph of the fourth paragraph of Section 75-1.035, "Bridge Joint Restrainer Units," of the Standard Specifications is amended to read:

The following materials shall be furnished to the Engineer at the manufacturer's plant:

1. One sample cable assembly, consisting of a cable properly fitted with a swaged fitting and right hand thread stud at both ends, 3 feet in total length, for each 200 cable assemblies or fraction thereof produced.
2. One turnbuckle fitted with an 8-inch stud at each end for each 200 turnbuckles or fraction thereof produced.
3. One percent of the cable yield indicators, but not fewer than 8, produced from each mill heat.
4. Two disc springs of each size produced from each mill heat.

The sixth paragraph in Section 75-1.035, "Bridge Joint Restrainer Units," of the Standard Specifications is amended to read:

Bolts, thread locking system and concrete anchorage devices shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal."

The Contractor shall notify the Engineer, in writing, at least 2 days prior to tightening and setting of cable restrainer units.

Miscellaneous metal (restrainer-cable type) will be measured and paid for by the pound in the same manner specified for miscellaneous metal (restrainer) in Sections 75-1.06, "Measurement," and 75-1.07, "Payment," of the Standard Specifications.

10-1.81 MISCELLANEOUS METAL (RESTRAINER-PIPE TYPE)

Miscellaneous metal (restrainer-pipe type) shall consist of bridge joint pipe restrainers with double extra strong steel pipe and associated hardware as shown on the plans and in conformance with the requirements in Section 75-1.035, "Bridge Joint Restrainer Units," of the Standard Specifications and in these special provisions.

The Contractor shall submit working drawings with the method of grouting the pipe restrainers in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications.

Double extra strong steel pipe shall conform to the requirements of ASTM Designation: A 53, Grade B.

Pipe restrainers shall be bonded to the existing concrete by completely filling the entire void between the pipe restrainer and the cored hole with grout within the limits shown on the plans. Grout shall conform to the provisions in Section 50-1.09, "Bonding and Grouting," of the Standard Specifications. Filler material and seals shall be provided along the sides of the pipe to be grouted, to prevent grout from entering the bridge hinge joints. The filler material and seals shall not restrict joint movement.

Miscellaneous metal (restrainer-pipe type) will be measured and paid for by the pound in the same manner specified for miscellaneous metal (restrainer) in Sections 75-1.06, "Measurement," and 75-1.07, "Payment," of the Standard Specifications.

Full compensation for bonding pipe restrainers to existing concrete shall be considered as included in the contract price paid per pound for miscellaneous metal (restrainer-pipe type) and no additional compensation will be allowed therefor.

10-1.82 MODIFY RESTRAINER

Modify restrainer shall consist of adding cable restrainers to existing cable restrainer anchorages, modifying existing cable restrainers, and relocating existing cable restrainers as shown on the plans and in conformance to the provisions for bridge joint restrainer units in Section 75-1.035, "Bridge Joint Restrainer Units," of the Standard Specifications and these special provisions.

Cleaning and painting of existing contact surfaces of high strength bolted connections that contain rust, loose paint or other foreign substances, except loose dirt and dust, will be paid for as extra work as provided in Section 4-1.03D, "Extra

Work," of the Standard Specifications. Damage to existing paint caused by the Contractor's operations shall be repaired by the Contractor at the Contractor's expense.

Damaged galvanized surfaces shall be repaired in conformance with the last paragraph of Section 75-1.05, "Galvanizing," of the Standard Specifications and these special provisions.

Where anchorages are removed from existing steel girder flanges, the flanges shall be cleaned and painted in conformance with Section 59, "Painting," of the Standard Specifications and these special provisions.

When existing cables are re-used, the disk springs, nuts, and washers shall be replaced, and the installation procedures followed on the plans.

The contract lump sum price paid for the various types of modify restrainer shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in modify restrainers, complete in place, including non-metallic materials for restrainer units, cleaning and painting, repairing galvanizing, and drilling holes into existing girders, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.83 CONFINEMENT ASSEMBLY

Confinement assembly shall consist of coring through existing concrete pier walls and post-tensioning high-strength rods against steel plate anchors at the San Gabriel River Bridge (Bridge Number 53-0109) as shown on the plans and in conformance with these special provisions.

Coring concrete shall be in conformance with "Core Concrete" of these special provisions. Immediately after coring, the concrete cores shall be identified by the Contractor with a description of the core locations and submitted to the Engineer for inspection. When reinforcement is cut, coring operations shall be terminated, and the Contractor shall submit to the Engineer for approval the procedure proposed to repair the cut reinforcement and to prevent further cutting of reinforcement.

Holes shall be cored by methods that will not shatter or damage the concrete adjacent to the holes.

High-strength rods shall conform to the provisions of Section 50-1.05, "Prestressing Steel" of the Standard Specifications. Prestressing equipment shall conform to the provisions of Section 50-1.058 "Prestressing," of the Standard Specifications. Pressure grouting shall conform to the provisions of Section 50-1.09, "Bonding and Grouting," of the Standard Specifications. The grout will not be required to pass through a screen with a 0.07-inch maximum clear opening prior to being introduced into the grout pump.

Cleaning and painting of confinement assembly shall conform to the provisions of "Column Casings" of these special provisions.

Cut ends of high-strength rods shall be turned down to avoid sharp edges.

Confinement assembly will be measured and paid for by the unit, as determined from actual count in place.

The contract unit price paid for confinement assembly shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in placing confinement assembly, complete in place, including core concrete, pressure grouting, prestressing, cleaning and painting, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.84 CHAIN LINK FENCE

Chain link fence shall be Type CL-6 and shall conform to the provisions in Section 80, "Fences," of the Standard Specifications and these special provisions.

Delete Section 80-1.02, "Existing Fences," of the Standard Specifications.

Attention is directed to Sections 7-1.11, "Preservation of Property," of the Standard Specifications and "Indemnification and Insurance," of these special provisions. Fences that are to remain in place and which have been damaged by the Contractor shall be replaced by the Contractor at the Contractor's expense.

10-1.85 CHAIN LINK WALK GATES

Chain link walk gates shall be Type CL-6 conforming to the provisions in Section 80, "Fences," of the Standard Specifications and these special provisions.

Gates shall be installed in existing fences at the locations shown on the plans. Gate installations shall be complete with gate post, latch post, concrete footings, braces, truss rods, and hardware. Gate and latch posts shall be braced to the next existing line post as shown on the plans.

At each gate location, an existing line post shall be removed and the new gate installed so it is centered on the post hole of the removed post. Holes resulting from the removal of line posts shall be backfilled.

Gate mounting and latching hardware shall not contain open-end slots for the fastening bolts.

Chain link fabric for gates shall be of the same mesh size as the existing fence in which the gates are installed.

Openings made in existing fences for installation of gates shall be closed during the working day in which the openings are made and when work is not in progress. Temporary closures shall be made with the existing fence fabric or with additional 6-foot chain link fabric as directed by the Engineer.

Full compensation for making the openings in existing fences, for temporary closing of the openings (including furnishing additional fence fabric if necessary), and for new posts, footings, hardware, braces, and truss rods shall be considered as included in the contract unit price paid for 4-foot chain link gate (Type CL-6) and no additional compensation will be allowed therefor.

10-1.86 MARKERS AND DELINEATORS

Markers and delineators shall conform to the provisions in Section 82, "Markers and Delineators," of the Standard Specifications and these special provisions.

Delete the first and second paragraphs of Section 82-1.02D, "Target Plates," of the Standard Specifications.

Target plates for highway post markers and Type L object markers installed on a metal post, shall be manufactured from zinc-coated steel sheet or aluminum sheet.

Target plates for Type K object markers shall be of the same color and material as the flexible post.

Delete the first and second paragraphs of Section 82-1.02F, "Reflectors," of the Standard Specifications.

Standard reflex reflectors conforming to the Department of Transportation current specifications for reflex reflectors for traffic signs, delineators and warning devices shall be attached directly to metal target plates on Type K and Type L object markers, and to the back of Class 2 delineator posts with Type E or Type I reflectorization. Copies of the current specifications are available at the Transportation Laboratory. The reflectors shall be of the type, size and color designated on the plans.

Reflectors for flexible target plates on Type K object markers and target plates on Class 2 delineators, and reflectors for Class 1 delineators shall be made from impact resistant retroreflective sheeting as specified in the special provisions. The color of the retroreflective sheeting shall conform to the color designated on the plans and the Chromaticity Coordinates specified in Federal Highway Administration Specification FP-85, or the PR color number specified by the Federal Highway Administration's Color Tolerance Chart.

Reflex reflectors or retroreflective sheeting may be used for object markers and delineators with rigid posts. Retroreflective sheeting shall be used for object markers and delineators with flexible posts.

Delete the first and second paragraphs of Section 82-1.04, "Marker Information," of the Standard Specifications.

Stenciled information for highway post markers shown on the plans or directed by the Engineer shall be painted or at the Contractor's option, the information may be applied with black cutout letters and numerals.

The black cutout letters and numerals shall be die-cut from material conforming to the Department of Transportation current specifications for retroreflective sheeting for use on aluminum signs, except that the material shall be black and opaque. Copies of the current specifications are available at the Transportation Laboratory, Sacramento, California.

Delete the first paragraph of Section 82-1.06, "Payment," of the Standard Specifications.

Items of work, measured as specified in Section 82-1.05, "Measurement," of the Standard Specifications will be paid for at the contract unit price for highway post markers and object markers of the type designated in the contract item, or at the single contract unit price paid for object markers or markers; and the contract unit price paid for delineators of the class designated in the contract item.

Markers and delineators on flexible posts shall be as specified in "Prequalified and Tested Signing and Delineation Materials," of these special provisions. Flexible posts shall be made from a flexible white plastic which shall be resistant to impact, ultraviolet light, ozone, and hydrocarbons. Flexible posts shall resist stiffening with age and shall be free of burns, discoloration, contamination, and other objectionable marks or defects which affect appearance or serviceability.

Retroreflective sheeting for metal and flexible target plates shall be the retroreflective sheeting designated for channelizers, markers, and delineators conforming to the requirements in ASTM Designation: D 4956-95 and in conformance with the provisions in "Prequalified and Tested Signing and Delineation Materials," of these special provisions.

10-1.87 INSTALL MEDIAN MILEAGE PANELS

Median mileage panels shall be installed at the locations as shown on the plans or where directed by the Engineer and in conformance with these special provisions.

Target plates will be furnished by the State as provided under "State-furnished Materials" of these special provisions. Installation holes in target plates shall be drilled or punched by the Contractor, after determination of type of installation. Target plates shall have only the necessary holes for the specified installation indicated.

Appropriate letters and numerals shall be affixed to the target plates by the Contractor in conformance to the requirements in Section 83, "Markers and Delineators," in the Standard Specifications and "Delineators," elsewhere in these special provisions.

Concrete anchorage devices for installing median mileage panels shall be cast-in-place or resin capsule type, conforming to the provisions of Section 65-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications and as shown on the plans.

Installing median mileage panels will be measured as units determined from actual count of median mileage panels in place.

The contract unit price paid for install median mileage panels shall include full compensation for furnishing all labor (including the affixing of the appropriate letters and numerals to the target plates and providing traffic control necessary to allow accurate and safe determination of median mileage panel locations), materials (except State furnished target plates), hardware tools, equipment, and incidentals, and for doing all the work involved in installing median mileage panels (including fastening hardware), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.88 METAL BEAM GUARD RAILING

Metal beam guard railing shall be constructed in conformance with the provisions in Section 83-1, "Railings," of the Standard Specifications and these special provisions.

Attention is directed to "Order of Work" of these special provisions.

Line posts and blocks shall be wood.

Delete the first, seventh, eighth, ninth, eleventh, twelfth, eighteenth and twenty-fourth paragraphs in Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications.

The rail elements, backup plates, terminal, end and return sections, bolts, nuts and other fittings shall conform to the requirements in AASHTO Designation: M 180, except as modified in Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications, as specified in Section 83-1.02, "Materials and Construction," of the Standard Specifications and these special provisions. The rail elements, backup plates, terminal, end and return sections shall conform to Class A, Type 1 W-Beam guard railing as shown in ASSHTO Designation: M 180. The edges and center of the rail element shall contact each post block. Rail elements shall be lapped not less than 12 1/2 inches and bolted. The rail metal, in addition to conforming to the requirements in AASHTO Designation: M 180, shall withstand a cold bend, without cracking, of 180 degrees around a mandrel of a diameter equal to 2.5 times the thickness of the plate.

At the option of the Contractor, metal beam guard railing shall be constructed using either steel posts or wood posts, both with wood blocks, for line posts. Only one type of line post shall be used for any one continuous length of guard railing.

Steel posts shall be fabricated from steel conforming to the requirements in ASTM Designation: A 36/A 36M, unless otherwise specified. Two certified copies of mill test reports of each heat of steel from which steel posts are formed or fabricated shall be furnished to the Engineer.

The grades and species of wood posts and blocks shall be No. 1 timbers (also known as No. 1 structural) Douglas fir or No. 1 timbers Southern yellow pine. Wood posts and blocks shall be graded in conformance with the provisions in Section 57-2, "Structural Timber," of the Standard Specifications, except allowances for shrinkage after mill cutting shall in no case exceed 5 percent of the American Lumber Standards minimum sizes, at the time of installation.

Wood posts and blocks shall be pressure treated after fabrication in conformance with the provisions in Section 58, "Preservative Treatment of Lumber, Timber and Piling," of the Standard Specifications with creosote, creosote coal tar solution, creosote petroleum solution (50-50), pentachlorophenol in hydrocarbon solvent, copper naphthenate, ammoniacal copper arsenate or ammoniacal copper zinc arsenate. In addition to the preservatives listed above, Southern yellow pine may also be pressure treated with chromated copper arsenate. When other than one of the creosote processes is used, blocks shall have a minimum retention of 0.40-pound per cubic foot and need not be incised.

If copper naphthenate, ammoniacal copper arsenate, chromated copper arsenate, or ammoniacal copper zinc arsenate is used to treat the wood posts and blocks, the bolt holes shall be treated as follows:

Before the bolts are inserted, bolt holes shall be filled with a grease, recommended by the manufacturer for corrosion protection, which will not melt or run at a temperature of 150° F.

At the Contractor's option, steel foundation tubes with soil plates attached, shall be either driven, with or without pilot holes, or placed in drilled holes. Any space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer shall be moistened and thoroughly compacted. Wood terminal posts shall be inserted into the steel foundation tubes by hand. Before the wood terminal posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts shall be coated with grease which will not melt or run at a temperature of 150° F or less. The edges of the wood terminal posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

Posts shall be placed at equal intervals as shown on the plans, except that the end posts may be spaced closer to adjacent posts if directed by the Engineer.

Terminal anchor assemblies for metal beam guard railing shall be constructed as shown on the plans and shall conform to the following provisions:

A terminal anchor assembly (Type SFT) for metal beam guard railing shall consist of an anchor cable, an anchor plate, a wood post, a steel foundation tube, a steel soil plate and hardware.

The anchor plate, metal plates, steel foundation tubes and steel soil plate shall be fabricated of steel conforming to the requirements in ASTM Designation: A 36/A 36M.

The anchor rods shall be fabricated of steel conforming to the requirements in ASTM Designation: A 36/A 36M, A 441 or A 572, or ASTM Designation: A 576, Grades 1018, 1019, 1021, or 1026. The eyes shall not be hot forged or formed with full penetration welds. After fabrication, anchor rods with eyes that have been formed with any part of the eye below 1,600° F during the forming operation or with eyes that have been closed by welding shall be thermally stress relieved prior to galvanizing. The completed anchor rod, after galvanizing, shall develop a strength of 50,000 pounds.

In lieu of built-up fabrication of anchor plates as shown on the plans, anchor plates may be press-formed from steel plate, with or without welded seams.

All bolts and nuts shall conform to the requirements in ASTM Designation: A 307, unless otherwise specified in these special provisions or shown on the plans.

Anchor cable shall be $\frac{3}{4}$ -inch preformed 6 x 19, wire strand core or independent wire rope core (IWRC), galvanized in conformance with the requirements in Federal Specification RR-W-401D, right regular lay, manufactured of improved plow steel with a minimum breaking strength of 23 tons. Two certified copies of mill test reports of each manufactured length of cable used shall be furnished to the Engineer. The overall length of each cable anchor assembly shall be as shown on the plans, but shall be a minimum of 6 feet 6 inches.

Where shown on the plans, cable clips and a cable thimble shall be used to attach cable to the anchor rod. Thimbles shall be commercial quality, galvanized steel. Cable clips shall be commercial quality drop forged galvanized steel.

The swaged fitting shall be machined from hot-rolled bars of steel conforming to AISI Designation: C 1035, and shall be annealed suitable for cold swaging. The swaged fitting shall be galvanized before swaging. A lock pin hole to accommodate a $\frac{1}{4}$ -inch, plated spring steel pin shall be drilled through the head of the swage fitting to retain the stud in proper position. The manufacturer's identifying mark shall be stamped on the body of the swage fitting.

The one inch diameter stud shall conform to the requirements ASTM Designation: A 449 after galvanizing. Prior to galvanizing, a $\frac{3}{8}$ -inch slot for the locking pin shall be milled in the stud end.

The swaged fittings, stud and nut assembly shall develop the specified breaking strength of the cable.

The cable assemblies shall be shipped as a complete unit including stud and nut.

Clevises shall be drop forged galvanized steel and shall develop the specified breaking strength of the cable.

One sample of cable properly fitted with swaged fitting and right hand thread stud at both ends as specified above, including a clevis when shown on the plans, 3 feet in total length, shall be furnished to the Engineer for testing.

The portion of the anchor rod to be buried in earth shall be coated with a minimum 20-mil thickness of coal tar enamel conforming to AWWA Standard: C203 or a coal tar epoxy conforming to the requirements in Steel Structures Painting Council Paint Specification No. 16, Coal-Tar Epoxy-Polyimide Black Paint or Corps of Engineers Specification, Formula C-200a, Coal-Tar Epoxy Paint.

Metal components of the anchor assembly shall be fabricated in conformance with good shop practice and shall be hot-dip galvanized in conformance with the provisions in Section 75-1.05, "Galvanizing."

Anchor cables shall be tightened after the concrete anchor has cured for at least 5 days.

Concrete used to construct anchors for terminal anchor assemblies shall be Class B or minor concrete conforming to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications.

Concrete shall be placed against undisturbed material of the excavated holes for terminal anchors. The top 12 inches of holes shall be formed, if required by the Engineer.

Reinforcing steel in concrete anchors for terminal anchor assemblies shall conform to the provisions in Section 52, "Reinforcement."

Delete the second and fifth through seventh paragraphs of Section 83-1.93, "Measurement," of the Standard Specifications.

Except for metal beam guard railing within the pay limits of a terminal system end treatment, metal beam guard railing will be measured by the linear foot along the face of the rail element from end post to end post of the completed railing at each installation. The point of measurement at each end post will be the center of the bolt attaching the rail element to the end post.

When metal beam guard railing is connected to structures, barriers, walls or abutments, the structure, barrier, wall or abutment will be considered the end post and the point used for measuring the rail length shall be the midpoint between the 2 bolts attaching the rail element to the structure, barrier, wall or abutment.

The measurement shall be made along the face of the rail elements without allowance for overlap at rail splices.

The quantity of the various types of terminal systems end treatments for metal beam guard railing will be measured as units determined from actual count in place in the completed work.

The quantity of terminal anchor assemblies (Type SFT) will be measured as units determined from actual count.

Delete the second and fifth paragraphs of Section 83-1.04, "Payment," of the Standard Specifications.

The contract unit price paid for the various types of terminal system end treatments for metal beam guard railing shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in furnishing and installing terminal system end treatments, complete in place, including excavation, backfill and disposal of surplus material and connecting the terminal system to new or existing metal beam guard railing, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit prices paid for terminal anchor assembly (Type SFT) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in constructing the terminal anchor assemblies, complete in place, including drilling anchor plate bolt holes in rail elements, driving steel foundation tubes, excavating for concrete anchor holes and disposing of surplus material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for connecting metal beam guard railing to bridge sidewalks and curbs, bridge railing, barriers, retaining walls, abutments and other flat concrete surfaces, and constructing guard rail layout flares (including special size and spacing of posts) shall be considered as included in the prices paid for the various items of metal beam guard railing work and no additional compensation will be allowed therefor.

TERMINAL SYSTEM (TYPE SRT).—Terminal system (Type SRT) shall be furnished and installed as shown on the plans and as specified in these special provisions.

Terminal system (Type SRT) shall be a SRT-350 Slotted Rail Terminal (8 post system) as manufactured by Trinity Industries, Inc., and shall include all the items detailed for terminal system (Type SRT) shown on the plans.

The 0.20 inch x 1 3/4 inch x 3 inch plate washer shown on the elevation view and in Section D-D at Wood Post No. 1 shall be omitted.

Arrangements have been made to insure that any successful bidder can obtain the SRT-350 Slotted Rail Terminal (8 post system) from the manufacturer, Trinity Industries, Include, P.O. Box 99, 950 West 400S, Centerville, UT 84014, Telephone (800) 772-7976. The price quoted by the manufacturer for the SRT-350 Slotted Rail Terminal (8 post system), FOB Centerville, Utah is \$845.00, not including sales tax.

The above price will be firm for orders placed on or before July 31, 2002, provided delivery is accepted within 90 days after the order is placed.

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance shall certify that terminal systems (Type SRT) conform to the contract plans and specifications, conform to the prequalified design and material requirements and were manufactured in conformance with the approved quality control program.

The terminal system (Type SRT) shall be installed in conformance with the manufacturer's installation instructions and these requirements. The steel foundation tubes with soil plates attached, shall be, at the Contractor's option, either driven, with or without pilot holes, or placed in drilled holes or placed in drilled holes. Space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer shall be moistened and thoroughly compacted. Wood terminal posts shall be inserted into the steel foundation tubes by hand. Before the wood terminal posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts shall be coated with a grease which will not melt or run at a temperature of 150° F. or less. The edges of the wood terminal posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

Surplus excavated material remaining after the terminal system (Type SRT) has been constructed shall be disposed of in a uniform manner along the adjacent roadway as directed by the Engineer.

10-1.89 CHAIN LINK RAILING

Chain link railing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications and these special provisions.

The chain link fabric shall be 9-gage, Type IV, Class B, bonded vinyl coated fabric, conforming to the requirements in AASHTO Designation: M 181.

The strength of the bond between the coating material and steel of the bonded vinyl coated chain link fabric shall be equal to or greater than the cohesive strength of the polyvinyl chloride (PVC) coating material.

10-1.90 CABLE RAILING

Cable railing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications.

10-1.91 CONCRETE BARRIER

Concrete barriers shall conform to the provisions in Section 83-2, "Barriers," of the Standard Specifications and these special provisions.

Delete the first paragraphs of Section 83-2.02D, "Concrete Barrier," of the Standard Specifications.

This work shall consist of constructing concrete barriers at the locations and in conformance with the details shown on the plans and in conformance with the provisions in Section 51, "Concrete Structures," and Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

Delete the second and eighth paragraphs of Section 83-2.02D(1), "General," of the Standard Specifications.

Concrete barriers shall present a smooth, uniform appearance in their final position, conforming to the horizontal and vertical lines shown on the plans or ordered by the Engineer, and shall be free of lumps, sags or other irregularities. The top and exposed faces of the barrier shall conform to the following requirements when tested with a 12-foot straightedge laid on the surfaces:

- a. For concrete barriers Type 50 and 60 series, the top shall not vary more than 0.02-foot from the edge of the straightedge and the faces shall not vary more than 0.04-foot from the edge of the straightedge.
- b. For concrete barriers other than Type 50 and 60 series, both the top and faces shall not vary more than 0.02-foot from the edge of the straightedge.

Granular material for backfill between the 2 walls of concrete barrier (Types 50E, 60E, 60GE and 60SE), as shown on the plans, shall be placed without compaction.

Delete the first, second and third paragraphs of Section 83-2.02D(2), "Materials," of the Standard Specifications.

Type 50 and 60 series concrete barriers shall be constructed of minor concrete conforming to the provisions in Section 90-10, "Minor Concrete," except as follows:

- a. The maximum size of aggregate used for extruded or slip-formed concrete barriers shall be at the option of the Contractor, but in no case shall the maximum size be larger than $1\frac{1}{2}$ inches nor smaller than $\frac{3}{8}$ -inches.
- b. If the $\frac{3}{8}$ -inch maximum size aggregate grading is used to construct extruded or slip-formed concrete barriers, the cement content of the minor concrete shall be not less than 658 pounds per cubic yard.

Concrete barriers other than Type 50 and 60 series shall be constructed of Class 2 concrete conforming to the provisions in Section 90, "Portland Cement Concrete."

The concrete paving between the tops of the 2 walls of concrete barrier (Types 50E, 60E, 60GE, and 60SE) and the optional concrete slab at the base between the 2 walls of concrete barrier (Types 50E, 60E, 60GE, and 60SE) shall be constructed of minor concrete conforming to the provisions of Section 90-10, except that the minor concrete shall contain not less than 500 pounds of concrete per cubic yard.

Delete the seventh paragraph of Section 83-2.20D(2), "Materials," of the Standard Specifications.

The sheet metal, neoprene strip and grease required at connections to structures shall conform to the following:

Sheet metal shall be commercial quality galvanized sheet steel, smooth and free of kinks, bends or burrs. Joints in the sheet metal shall be butt joints sealed with plastic duct sealing tape.

Neoprene strip shall conform to the provisions in Section 51-1.14, "Waterstops," of the Standard Specifications.

Grease shall conform to the requirements in Military Specification MIL-S-8660.

Delete the eighth paragraph of Section 83-2.20D(2), "Materials," of the Standard Specifications.

Granular material for backfill between the 2 walls of concrete barrier (Types 50E, 60E, 60GE, and 60SE) shall be earthy material suitable for the purpose intended, having no rocks, lumps or clods exceeding $1\frac{1}{2}$ inches in greatest dimension.

Delete Section 83-2.02D(3), "Construction Methods," of the Standard Specifications.

Type 50 and Type 60 series concrete barriers shall be constructed by either the "cast-in-place with fixed forms" method or the "extrusion or slip form" method or a combination thereof, at the Contractor's option.

Concrete barriers other than Type 50 or 60 series shall be constructed by the "cast-in-place with fixed forms" method.

Delete Section 83-2.02D(4), "Finishing," of the Standard Specifications.

The surface finish of concrete barriers Type 50 and Type 60 series, prior to the application of the curing compound, shall be free from surface pits larger than one-inch in diameter and shall be given a final soft brush finish with strokes parallel to the line of the barriers. Finishing with a brush application of grout will not be permitted.

To facilitate finishing, fixed forms for cast-in-place concrete barriers Type 50 and Type 60 series, shall be removed as soon as possible after the concrete has set enough to maintain the shape of the barrier without support.

Not less than 7 days after placing, exposed surfaces of concrete barriers, Type 50 and Type 60 series, shall receive a light abrasive blast finish so that a uniform appearance is achieved.

The final surface finish of concrete barriers other than Type 50 and Type 60 series shall be Class 1 Surface Finish conforming to the provisions in Section 51-1.18B, "Class 1 Surface Finish," of the Standard Specifications. Alternative final surface finish methods proposed by the Contractor shall be submitted in writing and shall not be used unless approved by the Engineer.

Delete Section 83-2.02D(5), "Curing," of the Standard Specifications.

Exposed surfaces of concrete barriers shall be cured with the non-pigmented curing compound (6) conforming to the provisions in Section 90-7.01B, "Curing Compound Method." At the Contractor's option, the formed surfaces of concrete barriers, which are on bridges or walls but which do not support soundwalls, may be cured as provided in Section 90-7.01D, "Forms-In-Place Method," except the forms shall be retained in place for a minimum period of 12 hours after the concrete has been placed. When curing Type 50 and Type 60 series concrete barrier, curing compound shall be applied by a mechanical sprayer capable of applying the curing compound to at least one entire side and the top of the concrete barrier in one application at a uniform rate of coverage. The spray shall be adequately protected against wind.

Concrete barriers shall be constructed on a layer of Class 3 aggregate base as shown on the plans. Said base shall conform to the provisions of "Aggregate Base" of these special provisions. When concrete barriers are to be constructed on aggregate base, the height of the barriers shall be adjusted to compensate for irregularities in the surface of the finished aggregate base. The amount of adjustment will be determined by the Engineer and will be ordered before the concrete is placed.

Delete the sixth, seventh, ninth, and tenth paragraphs of Section 83-2.03, "Measurement," of the Standard Specifications.

The quantity of terminal anchor assemblies will be paid for as units determined from actual count.

Concrete barriers will be measured by the linear foot.

Steel plates joining concrete barriers at overhead sign foundations, electroliers, drainage structures and other locations shown on the plans will be measured and paid for as the type of concrete barrier attached thereto.

Concrete barriers, except Type 50E, Type 60E, Type 60GE, and Type 60SE will be measured along the top of the barrier.

Concrete barriers Type 50E, Type 60E, Type 60GE, and Type 60SE will be measured along the centerline between the 2 walls of the barrier.

Concrete barrier (Type 50E Modified) will conform to the details shown on the plans and the provisions for concrete barrier (Type 50E) of these special provisions.

Delete the third paragraph of Section 83-2.04, "Payment," of the Standard Specifications.

The contract prices paid per linear foot for concrete barrier of the type or types listed in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the concrete barriers, complete in place, including bar reinforcing steel, steel dowels and drilling and bonding dowels in structures, hardware for steel plate barrier, miscellaneous metal, excavation, backfill (including concrete paving form, and granular material or concrete slab used as backfill in Type 50E, Type 60E, Type 60GE, and Type 60SE concrete barrier), and disposing of surplus material and for furnishing, placing, removing and disposing of the temporary railing for closing the gap between existing barrier, the concrete barrier being constructed, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The provisions of the third paragraph in Section 83-2.02D(4), "Finishing," of the Standard Specifications shall not apply.

Type 27A concrete barrier will be measured and paid for as concrete barrier (Type 27).

Type 27 (modified) concrete barrier will be measured and paid for as concrete barrier (Type 27).

Type 27A (modified) concrete barrier will be measured and paid for as concrete barrier (Type 27).

Type 732A concrete barrier will be measured and paid for as concrete barrier (Type 732).

Type 736A concrete barrier will be measured and paid for as concrete barrier (Type 736).

Concrete barrier transitions will be measured and paid for as the same type of concrete barrier being constructed that requires such transition.

Full compensation for PVC pipe used to construct Type 50W or Type 60W concrete barrier shall be considered as included in the contract price paid per linear foot for concrete barrier (Type 60W).

Full compensation for placement of scuppers in concrete barriers at the San Gabriel River Bridge (Widen), bridge number 53-0109, shall be considered as included in the contract price paid per linear foot for concrete barrier of the type or types listed in the Engineer's Estimate and no separate payment will be made therefor.

Full compensation for maintaining the existing traffic operation system in concrete barrier at the Rio Hondo Bridge (Widen) shall be considered as included in the contract price paid per linear foot for concrete barrier (Type 27) and no separate payment will be made therefor.

If reinforcement is encountered during drilling, before specified depth is attained, the Engineer shall be notified. Unless the Engineer approves coring through the reinforcement, the hole will be rejected and a new hole, in which reinforcement is not encountered, shall be drilled adjacent to the rejected hole to the depth shown on the plans.

10-1.92 CRASH CUSHION (REACT)

Crash cushion (REACT) shall be furnished and installed as shown on the plans and in conformance with the provisions in the Standard Specifications and these special provisions.

Crash cushion (REACT) shall be a multiple recoverable type, manufactured by Roadway Safety Service, Inc. Crash cushion (REACT) and additional components shall conform to the descriptions as follows:

Contract Item Description	Manufacturer's Product Description
Crash Cushion (REACT 9SCBS)	REACT 350.9 Concrete Side Mount

The successful bidder can obtain the crash cushion from the following source:

- A. Manufacturer: Roadway Safety Service, Inc., A Quixote Company, One East Wacker Drive, Suite 3000, Chicago, Illinois 60601.
- B. Distributors:
 - 1. Southern California: Traffic Control Service, Inc., 1881 Betmor Lane, Anaheim, California 92805, Telephone 1-800-222-8274, FAX 1-714-937-1070.
 - 2. Northern California: Traffic Control Service, Inc., 8585 Thys Court, Sacramento, California 95828, Telephone 1-800-884-8274, FAX 1-916-387-9734.

The price quoted by the manufacturer for Crash Cushion (REACT 9SCBS), FOB Pell City, Alabama is \$27,527, not including sales tax.

The above prices will be firm for orders placed within 30 days of contract award, and provided delivery is accepted within 90 days after the order is placed.

The prices quoted do not include the concrete backup block, concrete anchor slab or the W-Beam connection to barrier.

Crash cushion shall be installed in conformance with the manufacturer's recommendations.

Concrete anchorage devices used for attaching the crash cushion to the base slab shall be limited to those which have been proven satisfactory for such application by previous testing.

The concrete anchor slab shall conform to the provisions in Section 51, "Concrete Structures," and Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

The concrete anchor slab shall be constructed of concrete containing not less than 590 pounds of cement per yard.

The W-Beam connections to barrier shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications.

High strength bolts and nuts for W-Beam connections to barrier shall conform to the requirements in ASTM Designation: A 325 or A 325M and A 563 or A 563M, respectively.

The Contractor shall furnish the Engineer one copy of the manufacturer's plan and parts list for each model installed.

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance shall certify that crash cushion conforms with the contract plans and specifications, and conforms to the prequalified design and material requirements.

Crash cushion will be measured by the unit as determined from actual count in place in the completed work.

The contract unit price paid for crash cushion (REACT 9SCBS) shall include full compensation for furnishing all labor, materials (including anchor bolts, nuts, washers, and marker panels), tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing the crash cushions, complete in place, including structure excavation, structure backfill, bar reinforcing steel, concrete for anchor slab, transition plate, W-beam connector, and for furnishing and installing high strength bolts and plate washers, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.93 THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS

Thermoplastic traffic stripes (traffic lines) and pavement markings shall be applied in conformance with the provisions in Sections 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

Where striping joins existing striping, as shown on the plans, the Contractor shall begin and end the transition from the existing striping pattern into or from the new striping pattern a sufficient distance to ensure continuity of the striping pattern.

Delete Section 84-2.02, "Materials," of the Standard Specifications.

The thermoplastic material shall conform to the requirements of State Specification No. 8010-21C-19. Glass beads to be applied to the surface of the molten thermoplastic material shall conform to the requirements of State Specification 8010-004 (Type II).

State Specifications for thermoplastic material and glass beads may be obtained from the Transportation Laboratory.

Thermoplastic material for traffic stripes shall be applied at a minimum thickness of 0.070-inch.

At the option of the Contractor, permanent striping tape as specified in "Prequalified and Tested Signing and Delineation Materials" of these special provisions, may be placed instead of the thermoplastic traffic stripes and pavement markings specified herein, except that 3M, "Stamark" Series A320 Bisymmetric Grade, manufactured by the 3M Company, shall not be

used. Pavement tape, if used, shall be installed in conformance with the manufacturer's specifications. If pavement tape is placed instead of thermoplastic traffic stripes and pavement markings, the pavement tape will be measured and paid for by the linear foot as thermoplastic traffic stripe and by the square yard as thermoplastic pavement marking.

10-1.94 PAINT TRAFFIC STRIPES

Painting traffic stripes (traffic lines) shall be applied in conformance with the provisions in Sections 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

Delete the first five paragraphs of Section 84-3.02, "Materials," of the Standard Specifications.

Paint for traffic stripes and pavement markings shall conform to the following State Specifications:

Paint Type	Color	State Specification No.
Solvent-Borne Traffic Line	White, Yellow and Black	PT-170A
Waterborne Traffic Line	White, Yellow and Black	8010-20B
Acetone-Based	White, Yellow and Black	PT-150VOC
Waterborne Traffic Line	Blue (Federal Standard 595b, Color No. 35180)	Federal Specification No. TT-P-1952D

Glass beads shall conform to State Specification No. 8010-004 (Type II).

Copies of the State Specifications for traffic paint and glass beads may be obtained from the Transportation Laboratory.

The kind of paint to be used (solvent borne, water borne or acetone-based) shall be determined by the Contractor based on the time of year the paint is applied and local air pollution control regulations.

Delete the tenth paragraph of Section 84-3.05, "Application," of the Standard Specifications.

Paint to be applied in 2 coats shall be applied approximately as follows:

Paint Type	Square Foot Coverage Per Gallon	
	First Coat	Second Coat
Solvent Borne Paint	408	204
Water Borne Paint	245	245
Acetone-Based Paint	408	204

At the option of the Contractor, permanent striping tape conforming to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions, may be placed instead of the painted traffic stripes specified herein. Permanent tape, if used, shall be installed in conformance with the manufacturer's specifications. If permanent tape is placed instead of painted traffic stripes, the tape will be measured and paid for by the linear foot as paint traffic stripe of the number of coats designated in the Engineer's Estimate.

10-1.95 PAINT CURB AND STENCIL LETTERING

Painting curb and stencil lettering shall conform to the provisions in Section 59-6, "Painting Concrete," of the Standard Specifications and these special provisions.

Curb paint shall be red as shown on the plans.

Stencil lettering shall be white as shown on the plans and lettering size, style, and placement will be determined by the Engineer.

Paint curb and stencil lettering will be measured and paid for as paint traffic stripe (2-coat).

10-1.96 PAVEMENT MARKERS

Pavement markers shall be placed in conformance to the provisions in Section 85, "Pavement Markers," of the Standard Specifications and these special provisions.

Delete Section 85-1.02, "Type of Markers," of the Standard Specifications.

Pavement markers shall conform to one or more of the following types:

- Type A—Non-Reflective White Markers
- Type AY—Non-Reflective Yellow Markers
- Type C—Red-Clear Retroreflective Markers
- Type D—2-Way Yellow Retroreflective Markers
- Type G—One-Way Clear Retroreflective Markers
- Type H—One-Way Yellow Retroreflective Markers

Certificates of Compliance shall be furnished for pavement markers as specified in "Prequalified and Tested Signing and Delineation Materials " elsewhere in these special provisions.

Delete Section 85-1.03B(2), "Tolerances," of the Standard Specifications.

The entire sample of retroreflective pavement markers shall be tested for reflectance. The failure of 10 percent or more of the original sampling shall be cause for rejection.

Delete Section 85-1.04B, "Non-Reflective Pavement Markers (Plastic)," of the Standard Specifications.

Plastic non-reflective pavement markers Types A and AY shall be, at the option of the Contractor, either polypropylene or acrylonitrile-butadiene-styrene (ABS) plastic type.

Polypropylene non-reflective pavement markers shall consist of polyester resin binder, inert organic filler material and colorant pigments and shall conform to the provisions of the third paragraph in Section 85-1.04A, "Non-Reflective Pavement Markers (Ceramic)," except the requirements for adhesive bond strength in Test a shall be 475 pounds per square inch, minimum, and Tests b, c, g and i shall not apply.

ABS non-reflective pavement markers shall consist of ABS plastic conforming to the requirements in ASTM Designation: D 4673, Designation ABS 1-2-2, and shall conform to the provisions of the third paragraph in Section 85-1.04A, except Tests a, b, c, g and i shall not apply. The bottom of ABS plastic pavement markers shall have areas of integrally formed protrusions projecting from the surface to increase the effective bonding surface area and produce a structural bond with the pavement.

Delete Section 85-1.0B, "Reflective Pavement Markers," of the Standard Specifications.

RETROREFLECTIVE PAVEMENT MARKERS

The exterior surface of the shell shall be smooth and contain one or 2 retroreflective faces of the color specified.

The infrared curves of the plastic resins shall match approved curves on file in the Transportation Laboratory.

The base of the marker shall be flat (the deviation from a flat surface shall not exceed 1.5 mm), rough textured and free from gloss or substances which may reduce its bond to the adhesive. Retroreflective pavement markers shall conform to the following color and testing requirements:

Color

The color of the reflectors, when illuminated by the white light from a sealed-beam automobile headlight as defined by the Society of Automotive Engineers (SAE) Standard J 578, shall be an approved, clear, yellow or red color as designated. Off-color reflection shall constitute grounds for rejection. The daylight color of the marker body shall be compatible with the color of the primary lens, and shall be subject to approval by the Engineer.

Testing

Tests shall be performed in conformance with the requirements in California Test 669.

Test		Requirement		
1	Adhesive bond strength to bottom surface of the marker using adhesive specified in Sections 95-2.05, "Standard Set Epoxy Adhesive for Pavement Markers," and 95-2.04, "Rapid Set Epoxy Adhesive for Pavement Markers"	500 pounds per square inch minimum		
2	Reflectance	Specific Intensity		
		Clear	Yellow	Red
	0° Incidence Angle, min.	3.0	1.5	0.75
	20° Incidence Angle, min.	1.2	0.60	0.30
	After one year field evaluation	0.30	0.15	0.08
3	Strength	2,000 lbs. min.		
4	Water Soak Resistance	No delamination of the body or lens system of the marker nor loss of reflectance.		

- Failure of the marker body for filler material prior to reaching 500 pounds per square inch in the bond strength test 1 above shall constitute a failing bond strength test.
- Deformation of the marker of more than $\frac{1}{8}$ -inch at a load of less than 2,000 pounds or delamination of the shell and the filler material of more than $\frac{1}{8}$ -inch regardless of the load required to break the marker shall be cause for rejection of the markers as specified in Section 85-1.03, "Sampling, Tolerances and Packaging."

Delete the first and second paragraphs in Section 85-1.06, "Placement," of the Standard Specifications.

Except as otherwise noted in this Section 85-1.06, pavement markers shall be cemented to the pavement with hot melt bituminous adhesive or Rapid Set Type epoxy adhesive in conformance with the manufacturer's instructions.

In areas of new construction where the markers are protected from all traffic, including the Contractor's vehicles, Standard Set Type adhesive conforming to the provisions in Section 95-2.05 may be used. The protection from traffic shall be for at least 3 hours after marker placement when the pavement surface temperature is 55° F or above, at least 24 hours when the temperature is between 41° F and 55° F, and at least 48 hours when the temperature is 41° F or below.

Delete Section 85-1.08, "Measurement," of the Standard Specifications.

The quantity of retroreflective and non-reflective pavement markers will be measured as units determined from actual count in place.

Delete Section 85-1.08, "Measurement," of the Standard Specifications.

The contract price paid for pavement marker (retroreflective) and pavement marker (non-reflective) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and placing pavement markers, complete in place, including adhesives, and establishing alignment for pavement markers, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Attention is directed to "Traffic Control System For Lane Closure" elsewhere in these special provisions regarding the use of moving lane closures during placement of pavement markers with bituminous adhesive.

Retroreflective pavement markers shall comply with the specific intensity requirements for reflectance after abrading the lens surface in accordance with the "Steel Wool Abrasion Procedure" specified for pavement markers placed in pavement recesses in Section 85-1.05, "Reflective Pavement Markers," of the Standard Specifications.

SECTION 10-2. HIGHWAY PLANTING AND IRRIGATION SYSTEMS

10-2.01 GENERAL

The work performed in connection with highway planting and irrigation systems shall conform to the provisions in Section 20, "Erosion Control and Highway Planting," of the Standard Specifications and these special provisions.

When fluctuations of water pressure and water supply are encountered during normal working hours, plants shall be watered at other times, as often, and in sufficient amounts as conditions may require to keep the soil and plant roots moist during the life of the contract.

Full compensation for watering plants outside normal working hours shall be considered as included in the contract lump sum price paid for highway planting work and the contract lump sum price paid for plant establishment work and no additional compensation will be allowed therefor.

PROGRESS INSPECTIONS.--Progress inspections will be performed by the Engineer for completed highway planting and irrigation system work at designated stages during the life of the contract.

Progress inspections will not relieve the Contractor of his responsibility for installation in conformance with the special provisions, plans and Standard Specifications. Work within an area shall not progress beyond each stage until the inspection has been completed; corrective work has been performed; and the work is approved, unless otherwise permitted by the Engineer.

The requirements for progress inspections will not preclude additional inspections of work by the Engineer at other times during the life of the contract.

The Contractor shall notify the Engineer in writing, at least 4 working days prior to completion of the work for each stage of an area and shall allow a minimum of 3 working days for the inspection.

Progress inspections will be performed at the following stages of work:

During pressure testing of the pipelines on supply side of control valves.

During testing of low voltage conductors.

Before planting begins and after completion of the work specified for planting in Section 20-4.03, "Preparing Planting Areas," of the Standard Specifications.

Before plant establishment work begins and after completion of the work specified for planting in Section 20-4.05, "Planting," of the Standard Specifications.

At intervals of one month during the plant establishment period.

10-2.01A COST BREAK-DOWN

The Contractor shall furnish to the Engineer a cost break-down for the contract lump sum items of highway planting and irrigation system.

Cost break-downs shall be completed and furnished in the format shown in the samples of the cost break-downs included in this section. Unit descriptions of work shown in the samples are the minimum to be submitted. Additional unit descriptions of work may be designated by the Contractor. If the Contractor elects to designate additional unit descriptions of work, the quantity, value and amount for those units shall be completed in the same manner as for the unit descriptions shown in the samples. The units given in the samples are to show the manner of preparing the cost break-downs to be furnished by the Contractor.

The Contractor shall determine the quantities required to complete the work shown on the plans. The quantities and their values shall be included in the cost break-downs submitted to the Engineer for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-downs submitted for approval.

No adjustment in compensation will be made in the contract lump sum prices paid for highway planting and irrigation system due to differences between the quantities shown in the cost break-downs furnished by the Contractor and the quantities required to complete the work as shown on the plans and as specified in these special provisions.

The sum of the amounts for the units of work listed in each cost break-down for highway planting and irrigation system work shall be equal to the contract lump sum price bid for the work. Cost break-downs shall be submitted to the Engineer for approval within 30 working days after the contract has been approved. Cost break-downs shall be approved, in writing, by the Engineer before a partial payment for the items of highway planting and irrigation system will be made.

Approved cost break-downs will be used to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the items of highway planting and irrigation system due to changes ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost break-down, the adjustment in compensation will be determined in the same manner specified for increases and decreases in the quantity of a contract item of work in conformance with the provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

HIGHWAY PLANTING COST BREAK-DOWN

Contract No. 07-1069U4

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
ROADSIDE CLEARING	LS	LUMP SUM		
MULCH	CY			
COMMERCIAL FERTILIZER (SLOW RELEASE)	LB			
PLANT (GROUP A)	EA			
PLANT (GROUP U)	EA			

TOTAL _____

IRRIGATION SYSTEM COST BREAK-DOWN

Contract No. 07-1069U4

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
CHECK, TEST, AND REMOVE EXISTING IRRIGATION FACILITIES	LS	LUMP SUM		
MAINTAIN EXISTING IRRIGATION FACILITIES	LS	LUMP SUM		
CONTROL AND NEUTRAL CONDUCTORS	LS	LUMP SUM		
3/4" ELECTRIC REMOTE CONTROL VALVE	EA			
1" ELECTRIC REMOTE CONTROL VALVE	EA			
1 1/4" ELECTRIC REMOTE CONTROL VALVE	EA			
1 1/2" ELECTRIC REMOTE CONTROL VALVE	EA			
2" ELECTRIC REMOTE CONTROL VALVE	EA			
1" REMOTE CONTROL VALVE (BATTERY)	EA			
4 STATION IRRIGATION CONTROLLER (BATTERY)	EA			
4 STATION IRRIGATION CONTROLLER	EA			
12 STATION IRRIGATION CONTROLLER	EA			
16 STATION IRRIGATION CONTROLLER	EA			
24 STATION IRRIGATION CONTROLLER	EA			
REMOTE CONTROL VALVE ACTUATOR SYSTEM	LS	LUMP SUM		
3/4" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF			
1" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF			
1 1/4" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF			
1 1/2" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF			
2" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF			
2 1/2" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF			
1 1/2" PLASTIC PIPE (PR 315) (SUPPLY LINE)	LF			
2 1/2" PLASTIC PIPE (PR 315) (SUPPLY LINE)	LF			
SPRINKLER (TYPE A-1)	EA			
SPRINKLER (TYPE A-4)	EA			

IRRIGATION SYSTEM COST BREAK-DOWN (CONT'D)

Contract No. 07-1069U4

SPRINKLER (TYPE E-5)	EA			
1" FILTER ASSEMBLY UNIT	EA			
1 ¹ / ₄ " FILTER ASSEMBLY UNIT	EA			
1 ¹ / ₂ " FILTER ASSEMBLY UNIT	EA			
2" FILTER ASSEMBLY UNIT	EA			
1" GATE VALVE	EA			
2" GATE VALVE	EA			
2 ¹ / ₂ " GATE VALVE	EA			
2" BACKFLOW PREVENTER ASSEMBLY	EA			
BACKFLOW PREVENTER ASSEMBLY ENCLOSURE	EA			
1" BALL VALVE	EA			
1 ¹ / ₄ " BALL VALVE	EA			
1 ¹ / ₂ " BALL VALVE	EA			
2" BALL VALVE	EA			
2 ¹ / ₂ " BALL VALVE	EA			

TOTAL _____

10-2.02 EXISTING HIGHWAY PLANTING

In addition to the provisions in Section 20 of the Standard Specifications, work performed in connection with existing highway planting shall be in conformance with the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

Replacement planting shall conform to the requirements specified under "Preservation of Property" elsewhere in these special provisions.

10-2.02A MAINTAIN EXISTING PLANTED AREAS

Existing plants shall be maintained throughout the life of the contract in conformance with these special provisions.

Existing plants shall be watered in conformance with the provisions in Section 20-4.06, "Watering," of the Standard Specifications.

Existing plants and plant basins to be maintained shall be inspected for deficiencies by the Contractor in the presence of the Engineer. Deficiencies requiring corrective action shall include weeds; dead, diseased, or unhealthy plants; missing plant stakes and tree ties; inadequate plant basins; and any other deficiencies needing corrective action to

promote healthy plant life, as determined by the Engineer. The inspection shall be completed within 10 working days after the start of work.

When directed by the Engineer, deficiencies found during the inspection shall be corrected by the Contractor. Correction of deficiencies, as directed by the Engineer, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

After initial deficiencies have been corrected as directed by the Engineer, the Contractor shall continue to maintain existing plants as often as necessary to maintain the area in a neat appearance. The work shall include the following and any other work needed to promote healthy plant growth and maintain the area in a neat appearance as determined by the Engineer.

Weed growth shall be killed before the weeds reach the seed stage of growth or exceed 6 inches in length.

Trash, debris and weeds shall be removed from existing planting areas. Weeds shall be killed prior to removal. Trash, debris and weed removal in ground cover areas shall extend beyond the outer limits of ground cover areas to the adjacent edges of paving, fences and proposed plants and planting areas, and 6-foot diameter area centered at each existing tree and shrub outside of existing ground cover areas.

Existing plant basins shall be kept well formed and free of silt. If existing plant basins require repairs, and the plant basins contain mulch, the mulch shall be replaced after the plant basins have been repaired.

When a portion of a new automatic irrigation system is completed, the existing plants to be watered by that portion of the irrigation system shall be watered automatically.

Pesticides for maintaining existing plants shall conform to the provisions in "Pesticides" of these special provisions.

If after completion of the initial inspection and correction of deficiencies, the Engineer determines that existing plants show signs of failure to grow, or are so injured or damaged as to render the plants unsuitable for the purpose intended, the existing plants shall be replaced. Removal, disposal and replacement of the existing plants, shall be in conformance with the provisions in "Preservation of Property" of these special provisions.

The contract lump sum price paid for maintain existing plants shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in maintaining existing plants, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-2.02B REMOVE EXISTING PLANTS FOR TRENCHING

Remove existing plants for trenching shall conform to the provisions in Section 20-5.026, "Remove Existing Plants for Trenching," of the Standard Specifications and these special provisions.

Remove existing plants for trenching work shall consist of removing and replacing ground cover, pruning trees and shrubs within trench locations, applying preemergents and disposing of removed ground cover and prunings.

Replacement of removed ground cover within the maximum 5-foot width, as specified in Section 20-5.026 of the Standard Specifications, will be required, except for trenches within 5 feet of fences, curbs, dikes or shoulders.

Trees and shrubs adjacent to dikes, walks, fences, guard railing, and pavement edges may be pruned back 10 feet from these facilities to facilitate trenching work. When trenching is to be performed adjacent to other trees and shrubs that cannot be avoided, the trees and shrubs may be pruned upon receipt of prior written approval of the Engineer.

Pruning shall include removal of deadwood, suckers and broken or bruised branches one inch or larger in diameter. Pruning shall conform to the provisions in Section 20-4.055, "Pruning," of the Standard Specifications.

Removed ground cover and pruned materials shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. At the Contractor's option, removed ground cover and prunings may be reduced to chips. Chipped materials shall be spread within the highway right of way where designated by the Engineer.

Shrubs adjacent to dikes, fences, guard railing, and edge of pavement within the 10-foot pruned area designated above, that in the opinion of the Engineer should be removed after pruning, shall be removed and disposed of. Removing and disposing of the shrubs not otherwise provided for will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

One application of a preemergent pesticide shall be applied to trenched areas in existing ground cover areas and to trenched areas adjacent to fences, curbs, dikes and shoulders. The Engineer will determine when the preemergent pesticide shall be applied.

Where trenching for new irrigation facilities is performed in existing ground cover, sufficient ground cover shall be removed to permit the proper installation of the facilities, but in no case shall the removal width exceed 6 feet. Removed ground cover shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13.

Ground cover removed or rototilled within the maximum 6 foot wide removal area shall be replaced with new plants of the same variety as the existing ground cover. Carpobrotus replacement plants shall be cuttings conforming to the

provisions in Section 20-2.13, "Plants," of the Standard Specifications and shall be planted 12 inches on center. Other ground cover replacement plants shall be from flats and shall be planted 12 inches on center.

10-2.02C PRUNE EXISTING PLANTS

Pruning of plants shall be consistent with American National Standards Institute (ANSI) A300-1995. "Tree, Shrub and Other Woody Plant Maintenance-Standard Practices," and "Tree-Pruning Guidelines," published by the International Society of Arboriculture (ISBN 1-881956-07-5).

Existing plants, as determined by the Engineer, shall be pruned. Pruning of the existing plants, except as otherwise provided in these special provisions, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

10-2.03 EXISTING HIGHWAY IRRIGATION FACILITIES

The work performed in connection with the various existing highway irrigation system facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

Water shall be maintained in conformance with the provisions in Section 20-5.025, "Maintain Existing Water Supply," of the Standard Specifications.

10-2.03A CHECK AND TEST EXISTING IRRIGATION FACILITIES

Existing irrigation facilities that are to remain or be relocated, and that are within those areas where clearing and grubbing or earthwork operations are to be performed, shall be checked for missing or damaged components and proper operation prior to performing clearing and grubbing or earthwork operations. Existing irrigation facilities outside of work areas that are affected by the construction work shall also be checked for proper operation.

A written list of existing irrigation system deficiencies shall be submitted to the Engineer within 5 working days after checking the existing facilities.

Deficiencies found during checking existing facilities shall be corrected as directed by the Engineer. Corrective work ordered by the Engineer will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

When existing irrigation facilities are checked, existing backflow preventers to remain shall be tested for proper operation in conformance with the provisions in Section 20-5.03J, "Check and Test Backflow Preventers," of the Standard Specifications.

Existing backflow preventers shall be retested one year after the satisfactory completion of the previous test or 10 days prior to completion of the plant establishment period, whichever occurs first.

Existing backflow preventers shall be tested in conformance with the provisions in "Irrigation Systems" of these special provisions.

Length of watering cycles for use of potable water from water meters for checking or testing existing irrigation facilities shall be as determined by the Engineer.

Repairs to the existing irrigation facilities ordered by the Engineer after checking and testing the facilities, and further repairs required thereafter as ordered by the Engineer, except as otherwise provided for under "Maintain Existing Irrigation Facilities" of these special provisions, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

10-2.03B MAINTAIN EXISTING IRRIGATION FACILITIES

Existing irrigation facilities shall be maintained throughout the life of the contract. Prior to the start of maintaining existing irrigation facilities work, the facilities shall be checked for proper operation, and repaired in conformance with the provisions in "Check and Test Existing Irrigation Facilities" of these special provisions.

After the existing facilities have been checked and repaired, the Contractor shall be responsible for the routine maintenance of existing irrigation systems. The work shall include, but not limited to, checking irrigation systems for proper operation and adjusting, repairing or replacing valves, valve boxes, sprinklers, risers, swing joints, wye strainers, valve assembly units, and filter assembly units.

The Contractor will not be responsible for maintaining existing water meters, underground pipe supply lines, control and neutral conductors, and electrical conduits. Except as otherwise specified under "Existing Highway Irrigation Facilities" of these special provisions, repair work to these facilities ordered by the Engineer will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

Existing automatic irrigation systems shall be operated automatically during the life of the contract, except manual operation will be allowed for the work during plant replacement, fertilization, weed germination, and the repair of irrigation facilities.

Irrigation controllers shall be programmed by the Contractor for seasonal water requirements. During winter seasons irrigation systems shall be operated automatically a minimum of 2 minutes every 2 weeks.

Irrigation systems and facilities shall be checked for proper operation at least once every 30 days. When required, as determined by the Engineer, adjusting, repairing or replacing irrigation facilities shall be completed within 5 working days after checking of the irrigation systems. Except as provided in these special provisions, repair and replacement of irrigation facilities shall conform to the provisions in "Existing Highway Irrigation Facilities" of these special provisions.

Existing irrigation facilities shown on the plans or specified in the special provisions to be removed shall remain in place until their use is no longer required as determined by the Engineer.

Existing irrigation facilities that are to remain or are to be maintained, as part of contract, shall be protected from damage. If the Contractor's operations damage the existing irrigation facilities, the damaged facilities shall be repaired or replaced, at the Contractor's expense, as follows:

Repair or replacement of damaged facilities shall be completed within 10 working days of the damage.

Replaced irrigation facilities shall be new and of equal or better quality than the damaged facility. Replacement irrigation facilities shall be compatible with the irrigation systems to remain.

After repair or replacement of the facilities is complete, the Contractor shall demonstrate to the Engineer that the repaired or replaced facilities operate properly. When remote control valves are repaired or replaced, the valves shall be tested with the irrigation controller in the automatic mode.

Except as provided elsewhere in these special provisions, full compensation for maintaining existing irrigation facilities, including checking irrigation facilities, shall be considered as included in the contract lump sum price paid for irrigation system and no separate payment will be made therefor.

10-2.03C REMOVE EXISTING IRRIGATION FACILITIES

Existing irrigation facilities where shown on the plans to be removed, shall be removed. Facilities that are more than 6 inches below finished grade may be abandoned in place. Immediately after disconnecting an existing irrigation facility to be removed or abandoned from an existing facility to remain, the remaining facility shall be capped or plugged, or shall be connected to a new or existing irrigation facility.

The Engineer shall be given written notification of the intent to remove existing irrigation facilities a minimum of 72 hours prior to removing these facilities.

Facilities to be removed, shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Full compensation for removing and disposing of existing irrigation facilities, and abandoning existing irrigation facilities, shall be considered as included in the contract lump sum price paid for irrigation system and no separate payment will be made therefor.

10-2.04 HIGHWAY PLANTING

The work performed in connection with highway planting shall conform to the provisions in Section 20-4, "Highway Planting," of the Standard Specifications and these special provisions.

10-2.04A HIGHWAY PLANTING MATERIALS

MULCH.--Mulch shall be wood chips. Wood chips produced from tree trimmings may contain leaves and small twigs.

Delete the second paragraph of Section 20-2.08, "Mulch," of the Standard Specifications.

Mulch materials produced from pine trees grown in Alameda, Monterey, Santa Clara, Santa Cruz, San Luis Obispo or San Mateo Counties shall not be used.

COMMERCIAL

Commercial fertilizer (slow release) shall be a pelleted or granular form, shall be slow release, and shall fall within the following guaranteed chemical analysis range:

Ingredient	Percentage
Nitrogen	16-21
Phosphoric Acid	6-10
Water Soluble Potash	4-10

10-2.04B ROADSIDE CLEARING

Delete the first paragraph of Section 20-4.025, "Roadside Clearing," of the Standard Specifications.

Roadside clearing shall consist of removing trash and debris, removing and controlling weeds, and removing existing plants as specified in the Standard Specifications and these special provisions.

Prior to preparing planting areas and wild flower seeding areas, or commencing irrigation trenching operations for planting areas, trash and debris shall be removed from these areas and a distance of 10 feet beyond the edges of those areas. At locations where proposed planting areas are 12 feet or more from the edges of dikes, curbs, sidewalks, fences, walls, paved shoulders and existing planting to remain or to be maintained, the clearing limit shall be 6 feet beyond the outer limits of the proposed planting areas.

In addition to removing trash and debris, the project area shall be cleared as specified herein:

At the option of the Contractor, removed trees and shrubs may be reduced to chips. Chipped material shall be spread within the project limits at locations designated by the Engineer. Chipped material shall not be substituted for mulch, nor shall the chipped material be placed within areas to receive mulch.

Weeds shall be killed and removed within proposed ground cover areas and within the area extending beyond the outer limits of the proposed ground cover areas to the adjacent edges of shoulders, dikes, curbs, sidewalks, walls, existing planting and fences. At those locations where proposed ground cover areas are 12 feet or more from the adjacent edges of shoulders, dikes, curbs, sidewalks, walls, and fences, the clearing limit shall be 6 feet beyond the outer limits of the proposed ground cover areas.

Weeds shall be killed and removed within proposed planting areas where plants are to be planted in groups or rows 15 feet or less apart and from within an area extending 6 feet beyond the outer limits of the groups or rows of plants.

Weeds shall be killed and removed within an area 6 feet in diameter centered at each plant location where the plants are to be planted more than 15 feet apart and are located outside of ground cover areas.

Weeds outside of mulched areas, plant basins, and ground cover shall be controlled by mowing. Limits of mowing shall extend from the weeds to be killed areas out to the edges of pavement, dikes, curbs, sidewalks, and fences.

After the initial roadside clearing is complete, additional roadside clearing work shall be performed as necessary to maintain the areas, as specified above, in a neat appearance until the start of the plant establishment period. This work shall include the following:

Trash and debris shall be removed.

Rodents shall be controlled.

Weed growth shall be killed before the weeds reach the seed stage of growth or exceed 6 inches in length, except for weeds in wild flower seeding areas to be mowed.

Weeds in plant basins, including basin walls, shall be removed by hand pulling, after the plants have been planted.

Areas outside the areas specified to be cleared of weeds shall be mowed.

WEED CONTROL.--Weed control shall also conform to the following:

Stolon type weeds shall be killed with glyphosate.

Tumbleweeds shall be removed by hand pulling before the tumbleweeds reach a height of 6 inches.

Removed weeds and ground cover shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

At the option of the Contractor, weed growth in mowed areas may be controlled by growth regulators. Growth regulators shall be applied before weeds exceed 12 inches in height.

Areas to be mowed shall be mowed when weed height exceeds 12 inches. Weeds shall be mowed to a height of 2 inches to 6 inches.

Roadside clearing work shall not include work required to be performed as clearing and grubbing as specified in Section 16, "Clearing and Grubbing," of the Standard Specifications.

10-2.04C PESTICIDES

Pesticides used to control weeds shall conform to the provisions in Section 20-4.026, "Pesticides," of the Standard Specifications. Except as otherwise provided in these special provisions, pesticide use shall be limited to the following materials:

Cacodylic Acid
Diquat
Fluazifop-butyl
Glyphosate
Isoxaben (Preemergent)
Sethoxydim
Oxadiazon - 50 percent WP (Preemergent)
Oryzalin (Preemergent)
Pendimethalin (Preemergent)
Prodiamine (Preemergent)
Trifluralin (Preemergent)
Ammonium Sulfate
Magnesium Chloride
Melfluidide (Growth regulator)
Napropamide (Preemergent)

Granular forms of Oxadiazon or Dichlobenil shall be applied in areas to be covered with mulch. Granular preemergents shall be limited to the following materials:

Dichlobenil (Preemergent)
Oxadiazon (Preemergent)

Granular preemergents shall be applied prior to the application of mulch. Mulch applications shall be completed in these areas on the same working day. Photosensitive dye will not be required.

Glyphosate shall be used to kill stolon type weeds.

Oxadiazon shall be of the emulsifiable concentration or wettable powder type, except when Oxadiazon is used under mulch in conformance with these special provisions.

Prior to the application of preemergents, ground cover plants shall have been planted a minimum of 3 days and shall have been thoroughly watered.

A minimum of 100 days shall elapse between applications of preemergents.

Except for ground cover plants, preemergents shall not be applied within 18 inches of plants or within wild flower seeding areas.

Growth regulators shall not be applied within 6 feet of trees, shrubs or vines.

Ammonium sulfate and magnesium chloride shall be used only in areas planted to *Carpobrotus* or *Delosperma*. Ammonium sulfate and magnesium chloride shall not be applied in a manner that allows the pesticides to come in contact with trees or shrubs.

If the Contractor elects to request the use of other pesticides on this project, the request shall be submitted, in writing, to the Engineer not less than 15 days prior to the intended use of the other pesticides. Except for the pesticides listed in these special provisions, no pesticides shall be used or applied without prior written approval of the Engineer.

Pesticides shall not be applied within the limits of plant basins. Pesticides shall not be applied in a manner that allows the pesticides to come in contact with the foliage and woody parts of the plants.

10-2.04D PREPARING PLANTING AREAS

Plants adjacent to drainage ditches shall be located so that after construction of the basins, no portion of the basin walls shall be less than the minimum distance shown on the plans for each plant involved.

PREPARE HOLES.—Holes for plants shall be excavated to the minimum dimensions shown on the plans.

Plant holes excavated by drilling shall have the sides of the holes scarified to encourage plant root penetration.

Backfill soil shall be thoroughly distributed throughout the entire depth of the plant hole without clods and lumps.

CULTIVATE.—Areas to be planted with Plant Group A and Plant Group U shall be cultivated.

Immediately prior to cultivation, commercial fertilizer shall be added to the areas to be cultivated. Commercial fertilizer shall be applied at the rate of 12 pounds per 1,000 square feet. Fertilizer shall be thoroughly mixed with the soil.

10-2.04E PLANTING

A granular preemergent shall be applied to areas to be covered with mulch outside of plant basins in conformance with the provisions in "Pesticides" of these special provisions.

Mulch placed in areas outside of plant basins shall be spread to a depth of not less than 3 inches.

Mulch shall not be placed within 3 feet of the center line of earthen ditches, within 3 feet of the edge of paved ditches, and within 3 feet of the centerline of drainage flow lines.

Attention is directed to "Irrigation Systems Functional Test" of these special provisions regarding functional tests of the irrigation systems. Planting shall not be performed in an area until the functional test has been completed for the irrigation system serving that area.

10-2.04F WILD FLOWER SEEDING

Wild flower seeding shall conform to the provisions in Section 20-3, "Erosion Control," of the Standard Specifications and these special provisions.

Wild flower seeding work shall consist of mowing weeds, scarifying the soil, furnishing and incorporating commercial fertilizer and dry applying native wild flower seed to areas designated on the plans as "Wild Flower Seeding."

Wild flower seeding materials shall not be applied prior to October 1 or after February 28. If wild flower seeding work cannot be performed prior to the start of plant establishment and within the above specified time limit, then the work shall be performed during the plant establishment period when directed by the Engineer.

Pesticides shall not be used on wild flower seeding areas after the seed has been applied.

SITE PREPARATION.--Immediately prior to planting wild flower seeding areas, trash and debris shall be removed, and weeds shall be mowed as close to the ground as possible. Removal of mowed material will not be required. After mowing and just prior to seed application, wild flower seeding areas shall be scarified to a minimum depth of one inch.

Removed trash and debris shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

MATERIALS.--Materials shall conform to the provisions in Section 20-2, "Materials," of the Standard Specifications and these special provisions.

SEED.--Seed shall conform to the provisions in Section 20-2.10, "Seed," of the Standard Specifications. Individual seed species shall be measured and mixed in the presence of the Engineer.

Seed shall be delivered to the job site in unopened separate containers with the seed tag attached. Containers without a seed tag will not be accepted.

A sample of approximately one ounce of seed will be taken from each seed container by the Engineer.

NON-LEGUME SEED.--Non-legume seed shall consist of the following:

NON-LEGUME SEED		
Botanical Name (Common Name)	Percent (Minimum) Germination	Pounds pure live seed per acre (Slope measurement)
Eschscholzia californica (California Poppy)	50	3.0
Gaillardia pulchella (Indian Blanket)	43	6.0
Hordeum californicum (California Barley)	45	12.0
Melica californica (California Melic)	45	8.0
Phacelia campanularia (California Blue Bells)	50	3.0
Vulpia microstachys (Small Fescue)	45	8.0

COMMERCIAL FERTILIZER.--Commercial fertilizer shall conform to the provisions in Section 20-2.02, "Commercial Fertilizer," of the Standard Specifications and shall have a guaranteed chemical analysis of 6 percent nitrogen, 20 percent phosphoric acid and 20 percent water soluble potash.

APPLICATION.--Wild flower seed shall be applied at the rate of 40 pounds per acre (slope measurement). Commercial fertilizer shall be applied at the rate of 300 pounds per acre (slope measurement).

Seed and fertilizer shall be incorporated into the soil to a maximum depth of 1/4 inch by raking, dragging or drilling.

Watering of wild flower seeding areas will not be required unless directed by the Engineer. When directed by the Engineer, the watering will be paid for by extra work as provided in Section 4-1.03D of the Standard Specifications.

MEASUREMENT AND PAYMENT.--Quantity of wild flower seeding to be paid for will be measured by the square yard.

The contract price paid per square yard for wild flower seeding shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in wild flower seeding, complete in place, including removing trash and debris, mowing weeds, scarifying the soil, and applying commercial fertilizer, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-2.04G PLANT ESTABLISHMENT WORK

The plant establishment period shall be Type 2 and shall be not less than 250 working days.

If wild flower seeding cannot be performed within the time limits specified under "Wild Flower Seeding" of these special provisions, and the Engineer determines that the work except wild flower seeding and plant establishment work has been completed, the Engineer will notify the Contractor in writing of the start of the plant establishment period.

Wild flower seeding not performed prior to the start of the plant establishment period shall be performed during the plant establishment period. The work involved in preparing areas to receive wild flower seeding and applying seed shall be in conformance with the provisions in "Wild Flower Seeding" of these special provisions.

Attention is directed to "Relief From Maintenance and Responsibility" in these special provisions regarding relief from maintenance and protection.

Commercial fertilizer (slow release) shall be applied to trees, shrubs, vines and ground cover during the first week of March or October of each year.. Commercial fertilizer shall be applied at the rates shown on the plans and shall be spread with a mechanical spreader wherever possible.

The center to center spacing of replacement plants for unsuitable ground cover plants shall be determined by the number of completed plant establishment working days at the time of replacement and the original spacing in accordance with the following:

ORIGINAL SPACING (Inches)	SPACING OF REPLACEMENT GROUND COVER PLANTS (Inches)		
	Number of Completed Plant Establishment Working Days		
	1-125	126-190	191-250
9"	9"	6"	6"
12"	12"	9"	6"
18"	18"	12"	9"
24"	24"	18"	12"
36"	36"	24"	18"

Weeds within plant basins, including basin walls and ground cover, shall be controlled by hand pulling.

Weeds within mulched areas and ground cover and outside of plant basins, shall be controlled by killing.

Weeds outside of mulched areas, plant basins, ground cover, the median, and paved areas shall be controlled by mowing. At locations where proposed planting areas are 12 feet or more from the edges of existing plantings to remain and from shoulders, dikes, curbs, sidewalks, fences, and walls, the mowing limit shall be 6 feet beyond the outer limits of the proposed planting area.

Vines shall be trained onto fences and walls or through cored holes in walls.

At the option of the Contractor, a growth regulator may be applied to mowed areas, provided the growth regulator is approved in advance by the Engineer and the growth regulator is applied in conformance with these special provisions. If a growth regulator is approved and applied, the growth regulator shall be at the Contractor's expense.

At the option of the Contractor, plants of a larger container size than those originally specified may be used for replacement plants during the first 125 working days of the plant establishment period. The use of plants of a larger container size than those originally specified for replacement plants shall be at the Contractor's expense.

After 125 working days of the plant establishment period have been completed, replacement of plants, except for ground cover plants, shall be one gallon size for seedlings, pot and liner size plants; 5-gallon size for one gallon size plants; 15-gallon size for 5-gallon size plants; and other plant replacement plants shall be the same size as originally specified..

When ordered by the Engineer, one application of a preemergent pesticide conforming to the provisions in "Pesticides" of these special provisions, shall be applied between 40 and 50 working days prior to completion of the plant establishment period. This work will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

The Contractor shall be required to adequately water plants, replace unsuitable plants, perform weed, rodent and other pest control and perform other work, as determined necessary by the Engineer, every working day during the plant establishment period.

Working days when the Contractor fails to adequately perform plant establishment work, including, but not limited to watering plants, replacing unsuitable plants, repairing erosion damage, removing trash and debris and performing weed, rodent and other pest control, determined necessary by the Engineer, will not be credited as plant establishment working days.

When the Engineer determines that the plant stakes are inadequate to support the plants during the plant establishment period, the plant stakes shall be replaced, at the Contractor's expense, with a larger diameter stake adequate to support the plant. Plant stakes shall be removed at any time during the plant establishment period when determined by the Engineer.

A watering schedule program for each irrigation controller shall be submitted to the Engineer for approval not less than 40 working days prior to the completion of the plant establishment period. If the Engineer determines the submitted watering schedule is unacceptable, a revised watering schedule shall be submitted to the Engineer for approval within 5 working days after receiving notice that the previously submitted schedule is unacceptable.

Written instructions on the use and adjustment of the installed irrigation controllers shall be given to the Engineer during the plant establishment period. The approved watering schedule program shall be implemented by the Contractor not less than 10 working days prior to the completion of the plant establishment period. The programming shall not relieve the Contractor of the responsibility to apply sufficient water as conditions may require to keep the plants in a healthy condition.

Previously installed filters shall be checked, removed, cleaned and reinstalled at intervals of four months during the plant establishment period.

The final inspection shall be performed in conformance with the provisions in Section 5-1.13, "Final Inspection," of the Standard Specifications and shall be completed a minimum of 20 working days before the estimated completion of the contract.

10-2.04H PAYMENT

Highway planting work will be paid for as a single contract lump sum price for highway planting, except that maintain existing plants, wild flower seeding and plant establishment work will be paid for separately in conformance with these special provisions.

10-2.05 IRRIGATION SYSTEMS

Irrigation systems shall be furnished and installed in conformance with the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications, except materials containing asbestos fibers shall not be used.

Attention is directed to the requirements specified under "Obstructions" elsewhere in these special provisions, regarding work over or adjacent to existing underground facilities. Excavation for proposed irrigation facilities shall not be started until the existing underground facilities have been located.

Pipe supply lines shall be pressure tested in accordance with the provisions in Section 20-5.03H, "Pressure Testing," of the Standard Specifications, except the pipe (supply line) on the discharge side of the control valve shall be tested by Method B as specified in Section 20-5.03H(2), "Method B," of the Standard Specifications.

Only pipeline trenches and excavation pits for supply lines being supplied from one water service point shall be open at one time. After pressure testing is complete, trenches and pits excavated for pipe supply lines, being supplied from one water service point, shall be backfilled prior to commencing excavations for pipe supply lines being supplied from another water service point.

Solvent cement and primer for PVC plastic pipe and fittings for supply line shall be of commercial quality specifically manufactured for use with rigid PVC plastic pipe and fittings and shall be applied separately. Solvent cement shall conform to the requirements of the local Air Quality Management District. The solvent cement and primer used shall be made by the same manufacturer. The color of the primer shall contrast with the color of the pipe and fittings.

VALVE BOXES.—

Valve boxes shall conform to the provisions in Section 20-2.24, "Valve Boxes," of the Standard Specifications, except as otherwise provided herein.

Valve boxes shall be precast portland cement concrete.

Covers for concrete valve boxes shall be cast iron or steel. Cast iron and steel covers shall be hinged with brass hinge pins for valve boxes containing valves smaller than 2 inches.

Covers for plastic valve boxes shall be glass fiber reinforced plastic or plastic.

Valve boxes shall be identified on the top surface of the covers by labels containing the appropriate abbreviation for the irrigation facility contained in the valve box as shown on the plans. Valve boxes that contain remote control valves shall be identified by the appropriate letters and numbers (controller and station numbers). Labels for valve boxes shall conform to the provisions in Section 20-5.03F, "Valves and Valve Boxes," of the Standard Specifications.

Label material shall be polyurethane with contrasting colors for the base, letters, and numbers.

10-2.05A ELECTRIC AUTOMATIC IRRIGATION COMPONENTS

IRRIGATION CONTROLLERS.--

Irrigation controllers shall be single, solid-state independent controllers conforming to the following:

1. Irrigation controllers shall be fully automatic and shall operate a complete 14-day or longer irrigation program.
2. A switch or switches shall be provided on the face of the control panel that will turn the irrigation controller "on" or "off" and provide for automatic or manual operation. Manual operation shall allow cycle start at the desired station and shall allow activation of a single station.
3. The watering time of each station shall be displayed on the face of the control panel.
4. The irrigation controller and the low voltage output source shall be protected by fuses or circuit breakers. The controller shall also be protected by special fuse circuitry that detects and displays when a fuse blows.
5. The irrigation controller mechanism, panel, and circuit board shall be connected to the low voltage control and neutral conductors by means of plug and receptacle connectors located in the irrigation controller enclosure. The irrigation controller shall be equipped with a quick-connect terminal strip for fast installation.
6. Each station shall have a variable or incremental timing adjustment with a range of 12 hours to a minimum of one minute.
7. Irrigation controllers shall be capable of 4 independent program schedules with 8 start times each.
8. Irrigation controllers shall have an output that can energize a pump start circuit or a remote control valve (master).
9. Irrigation controllers shall be manufactured by the same company and be equipped with a removable battery and programmable front panel.
10. Where direct burial conductors are to be connected to the terminals strip, the conductors shall be connected with the proper size open-end crimp-on wire terminals. No exposed wire shall extend beyond the crimp of the terminal and the wires shall be parallel on the terminal strip.

Attention is directed to the requirements specified in Section 10-3, "Signals, Lighting and Electrical Systems," of these special provisions, regarding electrical power for irrigation controllers and irrigation controller enclosure cabinets.

ELECTRIC REMOTE CONTROL VALVES.--Electric remote control valves shall conform to the following:

Control valves shall be electric remote control type, straight pattern globe valves, and shall be of brass construction as shown on the plans or specified in these special provisions. Compression disks or diaphragms in valves shall be replaceable. Valves shall be of the same size as the pipeline which the valves serve, unless otherwise shown on the plans. Control valves shall be capable of withstanding a cold water working pressure of 150 pounds per square inch. Valve handles shall be brass.

Electric remote control valves shall also conform to the following:

1. Valves shall be normally closed type.
2. Valves shall be completely serviceable from the top without removing the valve body from the system.

3. Valves shall be equipped with a device that will regulate and adjust the flow of water and shall be provided with a manual shutoff. The manual shutoff for valves larger than 3/4 inch shall be operated by a cross handle.
4. Valves for each irrigation controller shall be the same model series and shall be compatible with the model series of the irrigation controller.
5. Valve solenoids shall operate on the low voltage AC current supplied from the irrigation controller.
6. Valves shall be provided with manual bleeding devices.
7. Valves shall be equipped with internal diaphragms installed in the valve body casting.
8. Valve inlets and outlets shall have threaded fittings.

PULL BOXES.--Pull box installations shall conform to the provisions in Section 20-5.027I, "Conductors, Electrical Conduits and Pull Boxes," of the Standard Specifications.

CONDUCTORS.--Low voltage, as used in this subsection "Conductors" shall mean 36 volts or less.

Low voltage control and neutral conductors in pull boxes and valve boxes, at irrigation controller terminals, and at splices shall be marked as follows:

Conductor terminations and splices shall be marked with adhesive backed paper markers or adhesive cloth wrap-around markers, with clear, heat-shrinkable sleeves sealed over the markers.

Non-spliced conductors in pull boxes and valve boxes shall be marked with clip-on, "C" shaped, white extruded polyvinyl chloride sleeves. Marker sleeves shall have black, indented legends of uniform depth with transparent overlays over the legends and "chevron" cuts for alignment of 2 or more sleeves.

Markers for the control conductors shall be identified with the appropriate number or letter designations of irrigation controllers and station numbers. Markers for neutral conductors shall be identified with the appropriate number or letter designations of the irrigation controllers.

New control and neutral conductors that are to replace existing control and neutral conductors shall be the same size and color as the existing control and neutral conductors being connected to.

The color of low voltage neutral and control conductor insulation, except for the striped portions, shall be homogeneous throughout the entire thickness of the insulation.

Insulation for conductors may be UL listed polyethylene conforming to UL44 test standards with a minimum insulation thickness of 0.04 inch for wire sizes 10AWG and smaller.

Delete the ninth and fourteenth paragraphs of Section 20-5.027I, "Conductors, Electrical Conduit and Pull Boxes," of the Standard Specifications.

Splices for low voltage control and neutral conductors shall conform to the provision in Sections 86-2.09C, "Connectors and Terminals," 86-2.09D, "Splicing and Terminations," and 86-2.09E, "Splice Insulation," except "Method B" splice insulation, as shown on the plans, shall not be used. Tape used for insulating splices shall be a polyvinyl chloride type.

Conductors shall be installed in electrical conduit when conductors are to be surface mounted, installed in or on bridge structures, installed under paved areas, installed in conduit for water line crossovers and sprinkler control crossovers, or placed in concrete. Surface-mounted conduits, conduits installed in or on bridge structures; conduits installed in concrete; and conduits installed by jacking or drilling shall be the rigid steel type. All other electrical conduit, including electrical conduit installed in irrigation crossover conduits for water line crossovers and sprinkler control crossovers and conduits under paved areas shall be non-metallic.

Electrical conduit shall conform to the provisions in Sections 86-2.05A, "Material," and 86-2.05B, "Use," of the Standard Specifications.

At the option of the Contractor, other types of splice sealing materials and methods may be used provided other materials and methods have been approved in writing by the Engineer prior to installation of the connectors.

10-2.05B REMOTE CONTROL VALVE ACTUATOR SYSTEM

A remote control valve actuator system shall consist of a portable (hand held) receiver, a transmitter, a field carrying case, an AC power charging unit, and a receiver connector. The remote control valve actuator equipment shall be manufactured by the same manufacturer as the irrigation controller and shall be fully compatible with the irrigation controller. The receiver and transmitter shall comply with Federal Communications Commission (FCC) Rules and Regulations, Part 15, as of the date of manufacture.

The receiver connector shall be attached directly to the terminal strip of each irrigation controller and continue out to the socket head mounted to the outside of the irrigation controller enclosure cabinet as shown on the plans. The connector shall have an 18-inch jacketed multi-conductor cable with a spade lug terminal and shall have a "D" subminiature connector with gold plated contacts which allows the receiver unit to be plugged directly into the

connector. The connector housing shall be weather resistant thermoplastic with a hinged socket head cap with a screw to be used as a locking mechanism. The socket head cap screw shall be operated by means of a key which will be provided by the manufacturer.

The receiver shall be plugged into the receiver connector and shall operate the stations of the irrigation controller on radio signals from the transmitter. The receiver shall receive radio signals a minimum distance of one mile. Receiver circuitry shall be protected from overload by a field replaceable fuse. The receiver shall operate on 24-volts AC.

The transmitter shall be capable of providing a 2-way FM, radio signal for a minimum range of one mile to the receiver located at the irrigation controller enclosure cabinet. The transmitter shall have a digital key pad and instant actuation of the stations, master valves or pumps in random, numerical or reverse numerical sequences by pressing a single key for each function. The transmitter shall allow for remote data retrieval, manual control and programming. The transmitter shall operate a master valve or pump independently of the controller stations. The transmitter shall transmit a radio frequency of 27.250 MHz.

The power source for the portable units shall consist of a nine (9) volt replaceable battery.

The field carrying case shall allow complete and convenient operation of the unit while in the case.

Before the irrigation system functional test begins one complete remote control valve actuator system, except for receiver connectors, shall be delivered to the Engineer.

Full compensation for the remote control valve actuator system shall be considered as included in the contract lump sum price paid for irrigation system and no additional compensation will be allowed therefor.

10-2.05C BATTERY OPERATED CONTROLLERS.--

BATTERY CONTROLLERS.--

Battery operated controllers shall conform to the following:

Control Module

1. The irrigation controller (control module) shall be programmable by a separate transmitter device only. The program shall be communicated to the Control Module from the Field Transmitter via an infrared connection. The controller shall be of a module type, which may be installed in a valve box underground. The controller shall function normally if submerged in water and the communication from the transmitter shall function if submerged in water.
2. The control module shall be housed in an ABS plastic cabinet and shall be potted to insure waterproof operation. The control module shall have two mounting slots for screws allowing the module to be securely mounted inside a valve box.
3. The controller shall operate on one nine-volt (9V) alkaline battery for one full year regardless of the number of stations utilized. The controller shall operate 4 stations either sequentially or independently.
4. The controller shall have three independent programs with eight start times each, station run time capability from one minute to twelve hours in one minute increments, and a seven day calendar. The controller shall turn on stations via latching solenoids installed on the valves. Manual operations shall be initiated by attaching the Field Transmitter to the Control Module and programming a manual start. The controller shall be capable of manual single station or manual program operation.

Field Transmitter

1. The irrigation controller shall be programmable by a separate transmitter device (Field Transmitter) only. The Field Transmitter shall communicate to the Control Module via an infrared connection. The Field Transmitter shall be water-resistant and housed in ABS plastic and have a removable, reversible protective sheath. The Field Transmitter shall operate on one nine-volt (9V) alkaline battery.
2. The Field Transmitter shall have a large LCD screen and a seven-key programming pad. A beep sound shall confirm every keystroke. The screen shall automatically turn off after one minute when not in use.
3. The Field Transmitter shall be capable of programming an unlimited number of Control Modules.
4. The Field Transmitter shall be as manufactured by the same manufacturer as the battery-operated Remote Control Valve, battery-operated Irrigation Controller, Latching Solenoid and Rain Shutoff Device.

Latching Solenoid

1. The Latching Solenoid shall be supplied with an installed, filtered adapter allowing installation of the solenoid onto the valve.

2. The Latching Solenoid shall be as manufactured by the same manufacturer as the battery-operated Remote Control Valve, battery-operated Irrigation Controller, Field Transmitter and Rain Shutoff Device.
3. Rain Shutoff Device.
4. The Rain Shutoff Device shall function correctly only when buried less than 2" of sand. The device shall be pre-set and non-adjustable. The device shall function with a DC system only.
5. The Rain Shutoff Device shall be as manufactured by the same manufacturer as the battery-operated Remote Control Valve, battery-operated Irrigation Controller, Field Transmitter and Latching Solenoid.

BATTERY OPERATED REMOTE CONTROL VALVE.--

Battery operated remote control valve shall conform to the following:

1. The battery operated remote control valve shall be a normally closed, 24 VAC 50/60-cycle solenoid actuated globe/angle pattern design capable of handling the flow rate. The valve pressure rating shall not be less than 150 PSI, 10,4 Bars.
2. The valve body and bonnet shall be constructed of high impact, weather resistant PVC with stainless steel screws; diaphragm shall be of Buna-N rubber. The valve shall have the following recommended continuous pressure ratings at the temperatures indicated.

Temperature Pressure (Continuous)

73 Deg. F 150 PSI
 80 Deg. F 132 PSI
 90 Deg. F 112 PSI
 100 Deg. F 93 PSI
 110 Deg. F 75 PSI

3. The valve shall have manual open/close control (internal bleed) for manually opening and closing the valve without electrically energizing the solenoid. The valve's internal bleed shall prevent flooding of the valve box.
4. The valve shall house a fully encapsulated, one-piece solenoid with separate filter screen to protect control ports.
5. The valve shall be capable of accepting the Latching Solenoid for adaptation to the battery-operated irrigation controller.
6. The Latching Solenoid shall have a captured plunger with a removable retainer for easy servicing, and a leverage handle for easy turning.
7. The valve shall have a flow control stem for accurate manual regulation and/or shut off of outlet flow. The valve must open or close in less than 1 minute at 150 PSI, and less than 30 seconds at 20 PSI.
8. The valve construction shall provide for all internal parts to be removable from the top of the valve without disturbing the valve installation. The body shall have a removable O-ringed plug for installation in either globe or angle configuration.
9. The valve shall be as manufactured by the same manufacturer as the Battery-Operated Irrigation Controller, Field Transmitter, Latching Solenoid and Rain Shutoff Device.

Full compensation for battery operated controllers shall be considered as included in the contract lump sum price for irrigation system and no separate payment will be made therefor and shall include furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing battery operated controllers, complete in place, as specified in the these special provisions, and as directed by the Engineer.

10-2.05D IRRIGATION SYSTEMS FUNCTIONAL TEST

Functional tests for irrigation controllers and associated automatic irrigation systems shall conform to the provisions in Section 20-5.027J, "Testing," of the Standard Specifications and these special provisions.

Tests shall demonstrate to the Engineer, through one complete cycle of the irrigation controllers in the automatic mode, that the associated automatic components of the irrigation systems operate properly. If automatic components of the irrigation systems fail a functional test, these components shall be repaired at the Contractor's expense and the testing repeated until satisfactory operation is obtained.

Associated automatic components shall include, but not be limited to, remote control valve actuator systems, remote control valves, and rain sensors.

Upon completion of work on an irrigation system, including correction of deficiencies and satisfactory functional tests for the systems involved, the plants to be planted in the area watered by the irrigation system may be planted, provided the planting areas have been prepared as specified elsewhere in these special provisions.

10-2.05E PIPE

STEEL PIPE.--Galvanized steel pipe supply lines installed between water meters and backflow preventer assemblies shall be installed not less than 18 inches below finished grade, measured to the top of the pipe.

PLASTIC PIPE.--Plastic pipe supply lines shall be polyvinyl chloride (PVC) 1120 or 1220 pressure rated pipe with minimum pressure ratings (PR) as shown on the plans.

Plastic pipe supply lines shall have solvent cemented type joints. Primers shall be used on the solvent cemented type joints.

Plastic pipe supply lines (main) shall have a minimum cover of 18 inches.

Fittings for plastic pipe supply lines with a pressure rating (PR) of 315 shall be Schedule 80.

WATER METER

Water meters for the irrigation systems will be furnished and installed by the serving utility at the locations shown on the plans.

Upon receipt of a written request from the Contractor, the Engineer will make arrangements with the serving utility to install the water meters. The State will pay the costs and fees charged by the serving utility for the installations.

Attention is directed to Section 20-4.06, "Watering," of the Standard Specifications. The Contractor shall make the arrangements for furnishing and applying water until the water meters have been installed by the serving utility.

10-2.05F SPRINKLERS

Sprinklers shall conform to the type, pattern, material and operating characteristics listed in the "Sprinkler Schedule" shown on the plans.

Flexible risers shall be ultraviolet (UV) resistant, brown in color and shall conform to the details shown on the plans.

When required, risers for sprinklers shall contain a device that will automatically and instantly stop the flow of water from a riser when the riser is broken on the downstream side of the device. The device shall be installed as recommended by the manufacturer of the device.

Risers for sprinklers on slopes shall be set perpendicular to the plane of the slope.

Full compensation for furnishing and installing flow shutoff and pressure compensation devices on risers shall be considered as included in the contract lump sum price paid for irrigation system and no separate payment will be made therefor.

10-2.05G FILTER ASSEMBLY UNIT

A filter assembly unit shall consist of a filter housing, a reusable filter cartridge, a ball valve, fittings, pipe and valve box as shown on the plans.

Filter assembly units shall withstand a cold water working pressure of 150 pounds per square inch.

Pressure loss through the filter assembly units shall not exceed the following:

FILTER ELEMENT SIZE (inches)	MAX FLOW RATE (GPM)	PRESSURE LOSS AT MAX FLOW (psi)
1	30	14
1 1/2	45	3.5
2	80	3

Filter housings shall be manufactured of reinforced polypropylene plastic.

Filter cartridges shall be threaded plastic rings attached to one another to produce a reusable cylindrical form filter. Filters shall be capable of 140-mesh filtration.

Ball valves in filter assembly units shall be polyvinyl chloride (PVC). The ball seats shall be high molecular weight-high density polyethylene.

10-2.05H FINAL IRRIGATION SYSTEM CHECK

A final check of existing and new irrigation facilities shall be performed not more than 20 working days prior to acceptance of the contract.

The length of watering cycles using potable water measured by water meters for the final check of irrigation facilities will be determined by the Engineer.

Remote control valves connected to existing and new irrigation controllers shall be checked for automatic performance when controllers are in the automatic mode.

Unsatisfactory performance of irrigation facilities installed or modified by the Contractor shall be repaired and rechecked at the Contractor's expense until satisfactory performance is obtained, as determined by the Engineer.

Repair or replacement of existing irrigation facilities due to unsatisfactory performance shall conform to the provisions in "Existing Highway Irrigation Facilities" of these special provisions.

Nothing in this section, "Final Irrigation System Check," shall relieve the Contractor of full responsibility for making good or repairing defective work or materials found before the formal written acceptance of the entire contract by the Director.

Full compensation for checking the irrigation systems prior to the acceptance of the contract shall be considered as included in the contract lump sum price paid for plant establishment work and no additional compensation will be allowed therefor.

SECTION 10-3. SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS

10-3.01 DESCRIPTION

Electrical systems for the modify closed circuit television (CCTV) and fiber optic communication system, modify changeable message sign, lighting and sign illumination, ramp metering, traffic monitoring station and census station systems, the irrigation electric service, irrigation controller enclosure cabinet and interim ramp metering systems {microwave vehicle detection sensor (MVDS) locations} shall conform to the provisions in Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications and these special provisions.

Lighting equipment is included in the following structures:

- Rio Hondo Bridge (Bridge No. 53-0657)
- Santa Anita Avenue Undercrossing (Bridge No. 53-0658)
- Lexington Avenue Undercrossing (Bridge No. 53-0683)
- Tyler Avenue Undercrossing (Bridge No. 53-0659)
- Utah Avenue Pedestrian Undercrossing (Bridge No. 53-1028)
- Meeker Road Undercrossing (Bridge No. 53-1029)
- Peck Road Undercrossing (Bridge No. 53-0661)
- East El Monte Overhead (Bridge No. 53-0667)
- Stewart Street Undercrossing (Bridge No. 53-1037)
- Cogswell Road Undercrossing (Bridge No. 53-0662)
- Durfee Avenue Undercrossing (Bridge No. 53-1031)
- Garvey Avenue Undercrossing (Bridge No. 53-1032)
- Valley Boulevard Undercrossing (Bridge No. 53-0660)
- San Gabriel River Bridge (Bridge No. 53-0109 R/L)

Communication conduit is included in the following structures:

- Rio Hondo Bridge (Bridge No. 53-0657)
- Santa Anita Avenue Undercrossing (Bridge No. 53-0658)
- Lexington Avenue Undercrossing (Bridge No. 53-0683)
- Tyler Avenue Undercrossing (Bridge No. 53-0659)
- Utah Avenue Pedestrian Undercrossing (Bridge No. 53-1028)
- Meeker Road Undercrossing (Bridge No. 53-1029)
- Peck Road Undercrossing (Bridge No. 53-0661)
- East El Monte Overhead (Bridge No. 53-0667)
- Stewart Street Undercrossing (Bridge No. 53-1037)
- Cogswell Road Undercrossing (Bridge No. 53-0662)
- Durfee Avenue Undercrossing (Bridge No. 53-1031)
- Garvey Avenue Undercrossing (Bridge No. 53-1032)
- Valley Boulevard Undercrossing (Bridge No. 53-0660)
- San Gabriel River Bridge (Bridge No. 53-0109 R/L)

Locations of irrigation electric service, irrigation controller enclosure cabinet, interim ramp metering systems (MVDS locations) and modify traffic monitoring station, census station, ramp metering and changeable message sign systems are shown on the plans.

Relocate closed circuit television system work is to be performed at the following locations:

Location SB 311 – PM 31.1 Eastbound Route 10 west of Route 605 and Route 10 separation.

Location SB 303 – PM 30.3 Eastbound Route 10 west of Durfee Avenue.

Location SB 295 – PM 29.5 Eastbound Route 10 at Peck Road and Valley Boulevard.

Location SB 285 – PM 28.5 Eastbound Route 10 west of Santa Anita Avenue.

The San Gabriel Valley (Route 10 and Route 605) Communication Hub Building is located at the Route 605 and Route 10 Separation.

10-3.02 ABBREVIATIONS AND GLOSSARY

The following Abbreviations and Glossary apply to these special provisions.

Abbreviations:

ABAM:	22 AWG, twisted-pair cable with PVC jacket and aluminum shield.
ADM:	Add Drop Multiplexer.
AFC:	Automated Frequency Control.
AGC:	Automatic gain control.
AIS:	Alarm Indication Signal.
AISI:	American Iron and Steel Institute.
AMI:	Alternate Mark Inversion (a data transmission protocol.)
ANSI:	American National Standards Institute.
APD:	Avalanche Photo diode.
API:	Application Program Interface.
APL:	Average picture level.
APS:	Automatic Protection Switch.
AWM:	Appliance Wiring Material.
B3ZS :	Bipolar 3 Zero Substitution.
B8ZS:	Bipolar 8 Zero Substitution
BER:	Bit error rate.
BERTS:	Bit Error Rate Test Set.
BITS:	Building Integrated Timing Supply.
BNC:	Bayonet Navy Connector.

bps:	Bits per second.
BPV:	Bipolar Violation.
CCD:	Charge-Coupled Device.
CCIR:	International Radio Consultative Committee.
CCK:	Camera Control Keypad.
CCR:	Camera Control Receiver
CCT:	Camera Control Transmitter.
CCTV:	Closed Circuit Television.
cfm:	Cubic feet per minute.
CFR:	Code of Federal Regulations.
CIDH:	Cast In Drilled Hole.
CMIP:	Common Management Information Protocol.
CMISE:	Common Management Information Service Entity.
CMP:	Configuration Management Plan.
CMS:	Changeable Message Sign.
CODEC:	Coder - Decoder.
CPU:	Central Processing Unit.
CRT:	Cathode Ray Tube.
D4:	4th version of the D-signal format for time division multiplexers.
dB:	Decibel.
dBm:	Decibel referred to milliwatt.
dBm:	Decibel above reference noise.
DCC:	Digital Communication Channel.
DCE:	Data communication equipment.
DCN:	Digital Communication Network.
DCS:	Digital Cross-Connect System.
DIP Switches	Small in-line switches that have two states(on and off), that are mounted on a single multiple-switch unit.
DOS:	Disk Operating System.
DS-1:	Digital Signal Level 1. Digital Transmission Rate - 1.544 megabits per second.
DS-3:	Digital Signal Level 3. Digital Transmission Rate - 44.876 megabits per second.
DSX-1:	Digital Signal Cross-Connect Level 1.
DSX:	Digital Cross Connect.
DTE:	Data Circuit Terminating Equipment.
EIA:	Electronics Industries Association.
EMT:	Electrical Metallic Tubing.
ESF:	Extended Superframe or Extended Superframe Format (4).
F/O or FO:	Fiber optic.
FDDI	Fiber Distributed Data Interface
FDU:	Fiber Distribution Unit.
FRP:	Fiberglass Reinforced Plastic.
FXS:	Foreign Exchange Subscriber.
GFCI:	Ground Fault Circuit Interrupter.
GUI	Graphical User Interface.
HAR:	Highway Advisory Radio.
HVAC:	Heating Ventilation and Air Conditioning.
Hz:	Hertz.
IEEE:	Institute of Electrical and Electronics Engineers.
IRE:	IRE is a SMPTE Standard video reference level.
JEDEC:	Joint Electron Device Engineering Council (Cooperative effort between EIA and NEMA.)
LOS:	Loss of Signal.
M13:	Multiplexer, 28 DS-1 circuits to 1 DS-3 circuit.
MHz:	Megahertz.
MPTE:	Society of Motion Picture and Television Engineers.
MVDS	Microwave Vehicle Detection System
NE:	Network Element.
NEMA:	National Electrical Manufacturers Association.
nm:	nanometer.

NMS:	Network Management System.
NRZ:	Non-return to Zero.
NTSC:	National Television Standards Committee.
OAM&P:	Operations, Administration, Maintenance and Provisioning.
OC-12:	Optical Carrier level 12.
OC-3:	Optical Carrier level 3.
OC:	Optical Channel.
OD:	Outside Diameter.
OEM	Original Equipment Manufacturer.
OS Gateway Interface:	Open System Gateway Interface.
OSHA:	Occupational Safety and Health Administration.
OSI:	Open System Interconnect.
OTDR:	Optical Time Domain Reflectometer.
p-p:	Peak to Peak.
PC:	Personal Computer.
PCB:	Printed circuit board.
PIN:	P-type, intrinsic, N-type.
PM:	Performance Monitoring.
POSIX:	Portable Operating System for Computer Environments (IEEE standard.)
ppm	Periodic Pulse Metering
PRBS:	Pseudo-Random Bit Sequence pattern.
QRSS:	Quasi-Random Signal Source.
REA:	United States Rural Electrification Administration.
RETMA:	Radio-Electronics-Television Manufacturers Association (Former name of EIA.)
RF:	Radio Frequency.
RG:	Regulatory Guide.
RMS:	Ramp Metering Station.
RMS:	Root-mean-square.
RTS:	Request to send.
SF:	Superframe Format (D4).
SM:	Singlemode.
SMFO:	Singlemode Fiber Optic.
SONET:	Synchronous Optical Network.
SSOVP:	Solid State Over-voltage Protector.
SSPC:	Steel Structures Painting Council.
ST:	Type of Connector.
STS-1:	Synchronous Transport Signal Level 1. SONET Digital Transmission Rate - 51.840 megabits per second.
STS:	Synchronous Transport Signal.
TDM:	Time Division Multiplexer.
THHN:	Heat Resistant thermoplastic with Nylon Jacket Conductor.
THWN:	Moisture and Heat Resistant Thermoplastic with Nylon Jacket Conductor.
TIA:	Telecommunication Industries Association.
TL-1:	Transaction Language 1.
TLP:	Transmission Level Point.
TMC:	Traffic Management Center.
TSG:	Test Signal Generator.
TSI:	Time Slot Interchange.
UNC:	Unified National Coarse.
UNIX:	Specific operating system found in real-time applications.
UV:	Ultraviolet.
V:	Volt.
VAC:	Volts, Alternating Current.
VIC:	Video Interface Cable.
VID:	Video Identification and Date/Time Display.
VSK:	Video switch keypad.
VSM:	Video switch matrix.

VT-1.5:	Virtual Tributary-Level 1.5 (1.728 Mb/s.).
VT:	Virtual Tributary.
W:	Watt.
WFM:	Waveform Monitor.
WTO:	Wire Transit Only.
X.11, X.25:	specific protocol standards generated by the International Telecommunication Union (formerly CCITT.)
XHHW:	Moisture and Heat Resistant Cross Linked Synthetic Polymer Conductor.

Glossary:

ADM.--A single-stage multiplexer/demultiplexer point where full access can be gained along a fiber route operating at the OC-3, OC-12 or OC-48 line rate. Traffic can be added or dropped at the DS-1, DS-3, STS-1 or higher level per the needs of the application.

Asynchronous.--A network where transmission system payloads are not synchronized and each network terminal runs on its own clock.

Breakout.--The cable "breakout" is produced by (1) removing the jacket just beyond the last tie-wrap point, (2) exposing 0.9 m to 1.8 m of the cable buffers, aramid strength yarn and central fiberglass strength member, and (3) cutting the aramid yarn, central strength member and the buffer tubes to expose the individual glass fibers for splicing or connection to the appropriate device.

CCITT.--The technical organization of the United Nations specialized specifically for telecommunication, now the International Telecommunication Union. They function through international committees of telephone administrations and private operating agencies.

Cable Storage Cabinet.--A cabinet for holding excess cable slack for protection. The cable storage cabinet allows the user flexibility in equipment location and the ability to pull cable back for re-splicing.

Channel. --(1) An information path between a discrete input and a discrete output. (2) One single input to a multiplexer or output from a demultiplexer.

Closed Circuit Television Assembly. -- Camera, lens, environmental enclosure, and necessary connectors and cables.

Connector.--A mechanical device used to provide a means for attaching to and decoupling from a transmitter, receiver, or another fiber (such as on a patch panel).

Connectorized.--A term that describes a fiber to which a connector has been affixed.

Connector Module Housing (CMH).--A patch panel used in the FDF to terminate singlemode fibers with most common connector types. It may include a jumper storage shelf and a hinged door.

Couplers.--Couplers are devices which mate two fiber optic connectors to facilitate the transition of optical light signals from one connector into another. Couplers may also be referred to as: adapters, feed-throughs, and barrels. They are normally located within FDF's mounted in panels. They may also be used unmounted, to join two simplex fiber runs.

Drop-and-continue.--This is an advanced bandwidth management feature that permits simultaneous pass-through and tributary routing of designated time slots. Thus, traffic passing from an east-facing optical channel to a west-facing optical channel can exit at a tributary, spur, or inter-shelf interface at the same time. This drop-and-continue functionality allows traffic to be transferred between rings and also allow traffic to be routed through two separate nodes.

DS-1 Card.--A plug in module or circuit pack that contains ports for two or more DS-1 circuits.

Fiber Distribution Frame (FDF).--A rack mounted system that is usually installed in the TMC, or in a communication HUB, that consists of a standard equipment rack, fiber routing guides, horizontal jumper troughs, fiber distribution units (FDU), connector module housings (CMH), and splice module housings (SMH). The FDF serves as the "home" for the passive fiber optic components from cable breakout, for connection by jumpers, to the electronics.

The FDF serves as the "home" for the passive fiber optic components from cable breakout, for connection by jumpers, to the electronics.

Fiber Distribution Unit (FDU).--An enclosure containing both a Connector Module Housing (CMH) and a Splice Module Housing enclosure.

Field Cabinet.-- A roadside cabinet used for housing controllers or communication equipment.

Grooming.--Consolidating or segregating traffic from various locations, for example, DS0's or DS1's, over a larger bandwidth facility like DS-1's or DS-3's, for better bandwidth and equipment efficiency.

High Speed Interface Position.--The position within a SONET shelf that is allocated for the high speed interface like OC-3 or OC-12 optics.

Interconnection.--An electronic, fiber optic or electrical connection between controller unit, located inside a controller cabinet, and other components housed in other enclosures.

Jitter.--Short waveform variations caused by vibration, voltage fluctuations, control system instability, and so forth

Jumper.--A short fiber optic cable that has connectors installed on both ends, and is typically used for connection within a FDF.

Light Source.--A portable piece of fiber optic test equipment that, in conjunction with a power meter, is used to perform end-to-end attenuation testing. It contains a stabilized light source operating at the designed wavelength of the system under test.

Line.--A transmission medium with equipment at both ends used to transport information between two network elements.

Line-switched Ring.--A ring topology in which there are two fibers working in a bi-directional mode, where each fiber provides a path for half of the active traffic, as well as a path for half of the protection traffic. The line-switched ring is defined by Bellcore TR-1230.

Link.--A passive section of the system, the ends of which are to be connected to active components. A link may include splices and couplers. For example, a video link may be from a F/O transmitter to a video multiplexer (MUX).

Mux/Demux.--Multiplexer/demultiplexer.

Network Element.--Any active component or piece of equipment on the communication network.

Non-Return to Zero (NRZ).--A digital line code in which the signal level is low for a 0 bit and high for a 1-bit, and does not return to zero between successive 1 bits.

Non-revertive.--Defaulted to remain on the protection facility when an error has been cleared. The service has to be manually switched back to the service or working facility in this mode of operation.

OC-12 Card.--Optical interface circuit pack or module working at the OC-12 rate.

Office Alarm(Interface).--A point within an office or node where an equipment alarm could be connected.

Optical Time Domain Reflectometer (OTDR).--Fiber optic test equipment (similar in appearance to an oscilloscope) that is used to measure the total amount of power loss between two points and the corresponding distance. It provides a visual and printed display of the relative location of system components such as fiber sections, splices and connectors and as the losses that are attributed to each component or defect in the fiber.

Orderwire.--A channel used by installers to expedite the provisioning of lines.

Overhead.--Extra bits in a digital stream used to carry information besides traffic signals. Orderwire, for example, would be considered overhead information.

Patchcord.--A short jumper.

Path-switched Ring.--A ring topology in which there are two unidirectional paths for the signal to cross the network. Although one path is active and the other path is protection, the signal is transmitted in both directions, one direction active and the other protection. Path switching is defined by Bellcore TR-496.

Path.--A logical connection between a point where an STS or VT is multiplexed to the point where it is demultiplexed.

Personality.--The unique customization of system parameters to make the system more user friendly to any particular individual.

Pigtail.--Relatively short length of fiber optic cable that has a connector installed on only one end.

Power Meter.--A portable piece of fiber optic test equipment that, in conjunction with a light source, is used to perform end-to-end attenuation testing. It contains a detector that is sensitive to light at the designed wavelength of the system under test. Its display indicates the amount of power injected by the light source that arrives at the receiving end of the link.

Protection Ratio.--The proportion of working devices to "hot-standby" or "protection" devices in a working system. A 1:n indicates one protective device for n active components.

Provisioning.--Assigning a value to a system parameter or setting up a circuit or service by inputting the appropriate parameters into the system.

Repeater.--A device in which received signals are amplified, restored or reshaped to compensate for distortion and/or attenuation prior to retransmission.

Revertive.--Defaulted to return to the working facility when the error has been corrected.

Ring.--A circular closed loop network topology comprising of one or more stations. Information is sequentially passed from one station to the next in the ring.

Segment.--A section of F/O cable that is not connected to any active device and may or may not have splices per the design.

Shelf.--The smallest integral unit within a typical 7 foot high, 23 inch wide SONET equipment bay that houses a discrete OC-3 or OC-12 SONET terminal, along with the associated STS-1, DS-3 or DS-1 plug-in circuit packs or cards. The typical dimensions of a shelf is 21 1/4 inches high, 21 inches wide and 12 inches deep.

Single-ended Maintenance and Control.--A system capability that allows access to a full complement of integrated operations, administration, maintenance, and provisioning functions, using industry-standard interfaces, from a single or remote control location.

SONET Terminal.--Equipment comprised of a SONET multiplexer/demultiplexer that is located at both ends of a point-to-point configuration.

SONET.--A standard for optical transport that defines optical carrier levels and their electrically equivalent synchronous transport signals.

Splice Closure.--Normally installed in a splice vault, a splice closure is an environmentally sealed container used to organize and protect splice trays. The container allows splitting or routing of fiber cables from multiple locations.

Splice Module Housing (SMH).--The SMH stores splice trays as well as pigtails and short cable lengths.

Splice Tray.--A container used to organize and protect spliced fibers.

Splice Vault.--A splice vault is used to house splice closures.

System Gain(Optical).--The overall gain, expressed in dB, of the transmission path between the optical transmitter and receiver and can be determined by subtracting the receiver sensitivity from the end-of-life transmitter power.

Time Slot Interchange.--A capability of the SONET Multiplexer to provide bandwidth management for through traffic in the ADM, hub and ring applications. This capability allows any VT-1.5 or STS-1 time slot in an east-facing optical channel to be routed to any VT-1.5 or STS-1 time slot in a west-facing optical channel as desired.

Traffic Hairpinning.--A feature in SONET nodes that allows any VT-1.5 or STS-1 time slot on one tributary to be looped back to any VT-1.5 or STS-1 time slot on another tributary.

Transaction Language 1.--A machine-to-machine communication language that is a subset of CCITT's human-machine language.

Unidirectional Ring.--A ring topology where active traffic flows in one direction and protection is provided by the other.

Virtual Tributary.--A signal designed for transport and switching of sub-STs-1 payloads.

Wavelength Range (Optical).--The operating limits of a lightwave system expressed in the magnitude or length of the light waves, usually expressed in nanometers (nm).

10-3.03 COST BREAK-DOWN

The Contractor shall furnish to the Engineer a cost break-down for each contract lump sum item of work described in this Section 10-3.

The Contractor shall determine the quantities required to complete the work shown on the plans. The quantities and values shall be included in the cost break-down submitted to the Engineer for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-down submitted for approval.

No adjustment in compensation will be made in the contract lump sum prices paid for the various electrical work items due to differences between the quantities shown in the cost break-down furnished by the Contractor and the quantities required to complete the work as shown on the plans and as specified in the Standard Specifications and these special provisions.

The sum of the amounts for the units of work listed in the cost break-down for electrical work shall be equal to the contract lump sum price bid for the work. Overhead, and profit shall be included in each individual unit listed in the cost break-down, however, costs for traffic control system shall not be included. Bond premium, temporary construction facilities, plant and other items will not be paid for under the various electrical work items and shall be included in the mobilization bid item for the entire project.

The cost break-down shall be submitted to the Engineer for approval within 15 days after the contract has been approved. The cost break-down shall be approved, in writing, by the Engineer before any partial payment for the items of electrical work will be made.

At the Engineer's discretion the approved cost break-down may be used to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the item or items of electrical work due to changes ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost break-down, the adjustment in compensation may be determined at the Engineer's discretion in the same manner specified for increases and decreases in the quantity of a contract item of work in accordance with Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

The cost breakdown shall, as a minimum, include the following items:

- foundations - each type
- standards and poles - list by each type
- conduit - list by each size and installation method
- innerducts
- pull boxes and splice vaults - each type
- conductors and fiber optic cables- each size and type
- service equipment enclosures - each types
- pedestrian signal heads and hardware - each type
- pedestrian push buttons
- loop detectors - each type

splice vaults
fiber optic splice closure
twisted pair splice closure
closed circuit television cameras
closed circuit television camera , video and data node cabinets
telephone bridges
terminal blocks- each type
camera control receivers
fiber optic data modems
single fiber optic video transceivers
testing

10-3.04 EQUIPMENT LIST AND DRAWINGS

A maintenance manual shall be furnished for all installed controller units, CCTV camera, camera control receivers, single fiber optic video transceivers and auxiliary equipment, and vehicle detector sensor units. The maintenance manual and operation manual may be combined into one manual. The maintenance manual or combined maintenance and operation manual shall be submitted at the time the controllers are delivered for testing or, if ordered by the Engineer, prior to purchase. The maintenance manual shall include, but need not be limited to, the following items:

- (a) Specifications
- (b) Design characteristics
- (c) General operation theory
- (d) Function of all controls
- (e) Trouble shooting procedure (diagnostic routine)
- (f) Block circuit diagram
- (g) Geographical layout of components
- (h) Schematic diagrams
- (i) List of replaceable component parts with stock numbers

FIELD CABINETS.--Each field cabinet which is connected to the communication system shall be supplied with the following documentation, as it relates to this project, stored in a re-sealable water resistant folder mounted on the inside of the field cabinet door:

CCTV CAMERA

A copy of the video channel assignment table
A copy of the fiber assignment tables
A copy of the twisted pair assignment tables
A copy of the system schematic diagrams
A copy of the element reference table

CMS / TMS/ RMS/ CENSUS STATIONS

A copy of the wiring diagram for the communication elements at that site
A copy of the data node circuit assignment tables
A copy of the twisted pair assignment tables
A copy of the system schematic diagrams
A copy of the element reference table

HUB

A copy of the data node circuit assignment tables
A copy of the fiber assignment tables
A copy of the system schematic diagrams
A copy of the audio/data and video circuit at the hub

Additional information may be supplied by the Engineer to be used to produce the documentation listed above by adding the related information that applies to this project.

Full compensation for the maintenance manual and field cabinet documentation shall be considered as included in the contract lump sum price paid for system testing and documentation, and no separate payment will be made therefor.

10-3.05 MAINTAINING EXISTING AND TEMPORARY ELECTRICAL SYSTEMS

Ramp metering, census station and traffic monitoring station system shutdowns shall be limited to periods between the hours of 9:00 a.m. and 3:00 p.m.

Lighting and sign illumination and changeable message sign system shutdowns shall be limited to periods allowed for lane closures listed or described under "Maintaining Traffic," elsewhere in these special provisions.

The Contractor shall obtain written approval from the Engineer, not less than 72 hours prior to any system cutover, testing, disconnection or disruption of service from the existing traffic signal, ramp metering system, traffic monitoring station system, census station system, changeable message sign system, closed circuit television (CCTV) and fiber optic communication system, irrigation system, interim ramp metering systems (MVDS locations) and lighting and sign illumination system.

The tenth paragraph of Section 86-1.05, "Maintaining Existing and Temporary Electrical Systems," of the Standard Specifications is amended to read:

These provisions will not relieve the Contractor in any manner of the Contractor's responsibilities as provided in Section 7-1.16, "Contractor's Responsibility for the Work and Materials," of the Standard Specifications and "Indemnification and Insurance" of these special provisions.

Attention is directed to Section 7-1.11 "Preservation of Property," of the Standard Specifications. The Contractor shall maintain all existing electrical systems including services involved with the work for this project, and shall repair all damages to the electrical systems caused by their operations.

MAINTAINING EXISTING CLOSED CIRCUIT TELEVISION AND FIBER OPTIC COMMUNICATION SYSTEM FACILITIES

Existing closed circuit television (CCTV) and fiber optic communication systems are located within the project limits and may conflict with the construction, especially where trenching is performed.

The Contractor shall notify the Engineer a minimum of 72 hours, prior to starting any work in the vicinity of the existing closed circuit television (CCTV) and fiber optic communication systems and obtain as-built plans and specifications from the Engineer. The Engineer will advise the District Office of Intelligent Transportation System (ITS), telephone (213) 897-4698, of the Contractor's scheduled work.

The Contractor shall obtain written approval from the Engineer not less than 72 hours prior to any disconnection, or disruption, of service from the existing CCTV and fiber optic communication systems.

The Contractor shall obtain records from the Engineer that are of a pre-construction check conducted jointly by the Engineer and the District Office of ITS. The pre-construction check is to determine the exact location of all elements of the existing CCTV and fiber optic communication systems, to test the operations of the existing systems and to maintain records thereof.

The Contractor shall use hand tools in excavating, removing, relocating, repairing and replacing the elements of the existing CCTV and fiber optic communication systems as directed by the Engineer. Replaced elements of the existing CCTV and fiber optic communication systems shall be new and of equal or better quality than the damaged elements. Damaged cables shall be replaced from an original splice point to an original splice point. After replacement of cables, the number of splices shall be the same as the original installation. Fusion splicing is required for all fiber optic cables.

If any existing elements of the closed circuit television and fiber optic communication system are damaged by the Contractor's operations, the Contractor shall immediately notify the Engineer.

Replacement methods, including communication conduit types and bend radius and fusion splicing of all fiber optic cables, and replaced elements shall be approved in advance and in writing by the Engineer.

Removing, relocating, repairing and replacing the elements of the existing closed circuit television and fiber optic communication systems, including post-construction testing, ordered by the Engineer, and further repairs required thereafter as ordered by the Engineer, except as otherwise provided under "Existing Highway Facilities" of these special provisions, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

LIGHTING AND SIGN ILLUMINATION, RAMP METERING, TRAFFIC MONITORING (COUNT) STATION AND CENSUS STATION SYSTEMS RESTRICTIONS

The Contractor shall carry out work involving existing ramp metering, traffic monitoring station and census station controllers subject to the following restrictions:

No ramp metering, traffic monitoring station and census station controller shall be disconnected or disrupted between the hours of 6:00 a.m. and 9:00 a.m., and from 3:00 p.m. to 7:00 p.m., Monday through Friday.

No ramp metering, traffic monitoring station and census station controller shall be disconnected from its electrical power for more than 15 minutes in any 24 hour period without prior written approval from the Engineer.

No more than five individual Model 170 Controller locations, each with its own unique controller I.D. number, as indicated on the plans, shall be subject to disruption at any time during the system cutover.

The Contractor shall obtain written approval from the Engineer, not less than 72 hours prior to any system cutover, testing, disconnection or disruption of service from the existing traffic signal, ramp metering system, traffic monitoring station system, census station system, changeable message sign system, closed circuit television (CCTV) and fiber optic communication system, irrigation system, interim ramp metering systems (MVDS locations) and lighting and sign illumination system.

10-3.06 FOUNDATIONS

Delete the first paragraph of Section 86-2.03, "Foundations," of the Standard Specifications.

Portland cement concrete shall conform to Section 90-10, "Minor Concrete," of the Standard Specifications and these special provisions except concrete for reinforced pile foundation shall contain not less than 470 pounds of cement per cubic yard. Placement of concrete shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Delete the third paragraph of Section 86-2.03, "Foundations," of the Standard Specifications.

Except when located on structures, foundations for posts, standards and pedestals shall be placed "in the solid" and monolithic except for the top 2 inches which shall be placed after the post, standard or pedestal is in proper position.

Delete the fourth paragraph of Section 86-2.03, "Foundations," of the Standard Specifications.

After each post, standard and pedestal on structures is in proper position, mortar shall be placed under the base plate as shown on the plans. The exposed portions shall be formed to present a neat appearance. Mortar shall consist of one part by volume of portland cement and 3 parts of clean sand, shall contain only sufficient moisture to permit packing and shall be cured by keeping it damp for 3 days.

The eighth paragraph in Section 86-2.03, "Foundations," of the Standard Specifications is amended to read:

Anchor bars or studs and nuts, except for Type 30 and Type 31 lighting standards, shall conform to ASTM Designation: A 307. Headed anchor bolts for foundations shall conform to the specifications of ASTM Designation: A 307, Grade B with S1 supplementary requirements. At the option of the contractor, nonheaded anchor bolts for foundations shall conform either to the specifications of ASTM Designation: A 307, Grade C or to the provisions in AASHTO Designation: M 314, Grade 36 or 55 with S1 supplementary requirements. When nonheaded anchor bolts conforming to the specifications of ASTM Designation: A 307, Grade C are furnished, the end of each fabricated anchor bolt shall be either coded by end stamping as required in ASTM Designation: A 307 or the end that projects from the concrete shall be permanently coded with a green color by the manufacturer. High strength anchor bolts, bars or studs for Type 30 and Type 31 lighting standards shall conform to ASTM Designation: A 325, A 325M or A 449 and shall comply with the mechanical requirements in ASTM Designation: A 325 or A 325M after galvanizing. Nuts and washers for high strength anchor bolts shall conform to ASTM Designations: A 563 or A 563M, and F 476 or F 476M, respectively. In addition to the requirements in ASTM Designation: A 449, studs shall be marked on either end as required for bolt heads.

Foundations for CCTV camera pole shall conform to the provisions on Section 86-2.03, "Foundations," of the Standard Specifications and these special provisions.

10-3.07 STANDARDS, STEEL PEDESTALS AND POSTS

The sign panels will be State-furnished as provided under and in conformance with the provisions in "Materials" of these special provisions.

Handholes for signal standards shall be located 90° clockwise from the traffic signal mast arm.

The thirteenth subparagraph of the fourth paragraph of Section 86-2.04, "Standards, Steel Pedestals, and Posts," of the Standard Specifications is amended to read:

Standards with an outside diameter of 12 inches or less shall be round. Standards with an outside diameter greater than 12 inches shall be round or multisided. Multisided standards shall have a minimum of 12 sides which shall be convex and shall have a minimum bend radius of 4 inches.

Type 1 standards shall be assembled and set with the handhole on the downstream side of the pole in relation to traffic or as shown on the plans.

10-3.08 MAST ARM REPLACEMENT OR MODIFICATION

Mast arms on existing Type 31 lighting standards, shown on the plans to be replaced, shall be replaced with new mast arms conforming to the details shown on the plans and to the provisions in Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications and these special provisions, or, at the option of the Contractor, shall be modified as shown on the plans.

All welding of mast arms and qualification of welders shall conform to AWS D1.1, "Structural Welding Code."

Tenon shall be mechanically held in relation to the mast arm before welding tenon.

Welds and damaged galvanized surfaces of modified mast arms shall be painted with 2 applications of zinc-rich primer as provided in Section 75-1.05, "Galvanizing," of the Standard Specifications. The second application shall be applied at the installation site.

Nuts, bolts, cap screws and washers to be used for reinstalling or replacing Type 31 lighting standards shall be new and shall conform to the requirements for hardware used with new standards.

At each mast arm replacement location, a new or completely modified mast arm shall be on hand and ready for installation before closing traffic lanes or ramps.

Luminaires installed on modified mast arms shall be adjusted to be tipped up 5 degrees from the horizontal, or as directed by the Engineer.

10-3.09 SLIP BASE INSERTS

Slip base inserts, for installation between the lighting standards and the foundations, shall conform to the details shown on the plans.

The bottom slip base plate shall be welded to the bottom anchor plate before installation. The top slip base plate shall be drilled and tapped to accept the threaded studs shown on the plans. The studs shall not be welded to the top slip base plate. The pitch diameter of the threaded holes shall conform to ANSI Standard: B1.1, having a Class 2B tolerance. Threaded studs installed in the top slip base plate shall match the holes in the base of the lighting standard.

The optional cast steel plate shall conform to the provisions in Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications.

High strength bolts, nuts and flat washers used to connect slip base inserts shall conform to ASTM Designation: A 325.

10-3.10 CONDUIT

Conduit, including conduit for power conductors, in jacking runs, masonry walls and sidewalks and conduit from pull boxes and splice vault to cabinets and junction boxes in or on structures to be installed underground shall be Type 1 unless otherwise specified. All exposed conduit shall be Type 1. Detector termination conduits shall be Type 1.

Type 3 conduit shall be used for communication trunk line, including runs in elevated concrete slabs, except as shown on plans and shall not be exposed in any areas.

Conduit shall be installed by the methods shown on the plans except as specified in these special provisions and as directed by the Engineer. A flat, woven, lubricated, polyester tape with a minimum tensile strength of 1,800 pounds minimum shall be placed in all conduits and innerducts not used. At least four feet of tape shall extend beyond the termination.

The first, second, third, fourth, and fifth subparagraphs of the first paragraph of Section 86-2.05A, "Material," of the Standard Specifications are amended to read:

1. Type 1. Hot-dip galvanized rigid steel conduit conforming to the requirements in UL publication UL 6 for Rigid Metallic Conduit. The zinc coating will be tested in conformance with the requirements in ASTM Designation: A 239.
2. Type 2. Hot-dip galvanized rigid steel conduit conforming to Type 1 above and coated with polyvinyl chloride or polyethylene. The exterior thermoplastic coating shall have a minimum thickness of 35 mils.
3. Type 3. Rigid non-metallic conduit conforming to the requirements in the UL Standard for Rigid Non-Metallic Conduit (Publication UL 651). Type 3 conduit shall be installed at underground locations only.
4. Type 4. Liquid tight flexible metal conduit shall consist of conduit with a liquid tight, non-metallic, sunlight-resistant jacket over an inner flexible metal core. Type 4 conduit shall be UL listed for use as the grounding conductor.
5. Type 5. Intermediate steel conduit (IMC) conforming to the requirements in UL Publication 1242 for Intermediate Metallic Conduit. Type 5 conduit shall only be used when specified.

Add the following subparagraph of the third paragraph of Section 86-2.05B, "Use," of the Standard Specifications:

7. From an overhead sign to the adjacent pull box shall be 2-inch.

The eleventh paragraph of Section 86-2.05C, "Installation," of the Standard Specifications is amended to read:

A No. 12 copper pull wire or a pull rope shall be installed in conduits which are to receive future conductors. The pull rope shall consist of a flat, woven, lubricated, soft-fibered polyester tape with a minimum tensile strength of 1,800 pounds and shall have printed sequential measurement markings at least every 3 feet. At least 2 feet of pull wire or rope shall be doubled back into the conduit at each termination.

The conduit in a foundation and between a foundation and the nearest pull box shall be Type 1.

When a standard coupling cannot be used for coupling metal type conduit, a UL listed threaded union coupling, as specified in the third paragraph in Section 86-2.05C, "Installation," of the Standard Specifications, shall be used.

When Type 3 communication conduit is installed in a trench, after the bedding material is placed and conduit installed, the trench shall be backfilled with cement slurry backfill meeting the requirements of Section 19-3.062 of the Standard Specifications, except the maximum size aggregate shall be 3/8 inch (pea gravel), containing not less than 564 pounds of portland cement per cubic yard and commercial quality sand, to not less than 4 inches above the conduit before additional backfill material is placed.

In those areas where a jacking pit in a concrete shoulder is necessary to jack conduit across a roadway and the work has not been completed in a work shift the Contractor shall backfill the pit. Surface of pit shall have no less than 3/8 inch gap after each completed work day. When the work has been completed in a particular jacking area. The surface must be restored to its original condition.

When conduit is placed in a trench under paved shoulders, after the bedding material is placed and conduit installed, the trench shall be backfilled with slurry cement backfill to within 0.10-foot of existing shoulder surface.

Conduits located within the same trench shall have not less than 2 inches of separation.

Trenches shall be less than or equal to 8 inches width.

Attention is directed to "Aerially Deposited Lead" of these special provisions.

Immediately prior to installing conductors, cables and innerducts, all conduits shall be blown out with compressed air until all foreign materials are removed. After conductors cables and innerducts have been installed, the ends of conduits terminating in pull boxes, and in service equipment enclosures and controller cabinets shall be sealed with an approved type of sealing compound.

At locations where conduit is required to be installed under pavement and existing underground facilities require special precautions, in conformance with the provisions in "Obstructions" of these special provisions, conduit shall be placed by the "Trenching in Pavement Method" as specified in Section 86-2.05C, "Installation," of the Standard Specifications.

Conduit shall not be installed by trenching along the pavement of freeway lanes except in those sections of highway where there is insufficient clearance to locate a longitudinal trench off the traveled way, or where obstructions off the traveled way necessitate bends in the conduits in excess of those allowed.

Where conduits are shown on the plans to be installed parallel and adjacent to each other, they shall be installed together in a common trench as shown on the conduit installation details.

Power conduits placed in the same trench as communication conduits shall not terminate in communication pull boxes or splice vaults.

Communication conduits shall not terminate in power pull boxes.

COMMUNICATION CONDUIT

Communication conduit shall conform to the provisions specified above under "Conduit" and the following.

Communication conduit shall enter splice vault and communication pull boxes through knockouts. Conduits entering the ends of these boxes shall be vertically and horizontally aligned with the conduits at the opposite end of the box. Conduit ends shall not extend beyond the interior wall face of splice vault and pull boxes. The space around conduits through end walls of splice vault and communication pull boxes shall be filled with portland cement mortar conforming to the provisions in Section 51-1.135, "Mortar," of the Standard Specifications. In no case shall a conduit body or pull box be used in lieu of a specified bend to change the direction of the communication conduit run, except where specified.

No bends shall be placed in a section of conduit in excess of those indicated in the plans without the approval of the Engineer. The total degrees of bending in a section of conduit between splice vaults and communication pull boxes shall not exceed a total of 180 degrees, except where specified otherwise.

Changes in indicated conduit bends may be made in order to suit field conditions, as long as the change reduces the degree of the bend or increases the radius of the bend. In no case shall the angle of the bend be increased without the approval of the Engineer.

Minimum bending radius for 2-inch communication conduit shall be 24 inches and minimum bending radius for 4-inch communication conduit shall be 48 inches. Bends of greater than 22 degrees shall be factory bends and bends greater than 45 degrees shall galvanized rigid steel with any necessary adapters.

Deflections from the indicated communication conduit routing to avoid obstructions shall not exceed 1 in/ft. Conduit from the typical trench sections shall not deflect by more than 3-1/4 in/ft from the alignment preceding or following pull boxes and splice vaults.

The total sum of bend radius for the communication conduit between consecutive communication pull boxes or splice vault shall not exceed 360 degrees.

Where edge drains are in the path of conduit routing the Contractor must first locate the edge drains and install the conduit maintaining a minimum depth. In the event an edge drain is damaged by the Contractor's work, the Contractor will be responsible for a full repair at his cost.

Adjacent to over crossings or bridge foundations, the Contractor shall trench and install conduit in the shoulder as close as possible to the edge of traveled way so that a minimum of 5 feet from the outside face of footing or pile cap is maintained.

Colored Cement Backfill

The slurry cement backfill for the installation of communication conduits that will contain fiber optic cable shall be a medium to dark, red or orange color to clearly distinguish the concrete backfill from other concrete and soil. The concrete shall be pigmented by the addition of commercial quality cement pigment to the concrete mix. The red or orange concrete pigment shall be LM Scofield Company; Orange Chromix Colorant; Davis Colors; or equal.

For trenches in pavement areas, only the top 4 inches of slurry cement backfill will be required to be pigmented concrete. At the option of the Contractor, the full depth may have the pigment.

Full compensation for furnishing and incorporating the cement pigment to achieve the color required shall be considered as included in the contract price paid per linear foot for the various sizes and types of conduit involved and no separate payment will be made therefor.

Warning Tape

Warning tape shall be furnished and installed in the trench, over new conduits to receive reinstalled or new fiber optic cables, as shown on the plans. The warning tape shall consist of 4-inch wide bright orange pigmented polyolifin film with a bold printed message of approximately 3/4 inch black characters on one side. The message shall be: "CAUTION: BURIED FIBER OPTIC CABLE - CALTRANS (213) 897-0340," repeated at approximately 36-inch intervals. The tape shall be placed with the warning side up.

The warning tape shall not delaminate nor shall the message smear when wet. The tape and the printed message shall be resistant to insects and shall not degrade when exposed to alkalis, acids and other corrosive elements commonly found in soil. It shall have a minimum of 80 pounds tensile strength and a minimum of 700 percent elongation before breakage.

Warning tape shall be Condux International, Inc.; Allen System, Inc.; Reef Industries, Inc. or equal.

Full compensation for warning tape shall be considered as included in the contract price paid per linear foot for the various sizes and types of conduit involved and no separate payment will be made therefor.

Fiber Under Ground Warning Sign

Any communication conduit installed in soil where conduit can not be seen from above ground for more than 100 feet must have a warning sign. The signs must be placed within 16.5 feet of conduit at minimum 200 feet intervals.

The signs shall say "FIBER UNDER GROUND CALL 213-897-4698 CALTRANS ITS DEPT." The dimensions of the signs shall be at a minimum of 5 inches x 6 1/2 inches x 1/10 inches and made of galvanized sheet metal or aluminum sheet. The sign colors shall be white lettering with black background. The signs shall be bolted to right of way fence at a height of 5 feet. In the event the right of way fence is not within 16.5 feet from conduit installation, than contractor shall install signs on a metal post. Attention is directed to Standard Plan A73B.

Full compensation for furnishing fiber underground warning sign shall be considered as included in the price or prices paid for the conduit involved and no separate payment will be made

TWO 4 INCH CONDUIT (ATTACHED TO BRIDGE)

At the locations shown on the plans, where communication conduit is to be installed on bridges, fiberglass conduit shall be used and shall conform to the details shown on the plans, and to these special provisions. Two 4 inch conduit (attached to bridge) shall include excavation, installation of the fiberglass conduit, and placing sand and slurry cement backfill.

Excavation and slurry cement backfill shall conform to Section 19-3, "Structure Excavation and Backfill," of the Standard Specifications. The slurry cement backfill shall reach initial set prior to placing of reinforced concrete for the approach slab.

Two 4 inch conduit (attached to bridge) will be measured by the linear foot.

FIBERGLASS CONDUIT

General: Fiberglass conduit and components shall comply with the specifications in ANSI/NEMA Standards Publication TC-14A or TC-14B. All fiberglass conduit components shall be free of defects including delaminations, foreign inclusions, etc. All fiberglass conduit components shall be nominally uniform (as commercially practical) in color, density, and physical properties. Fiberglass conduit shall be straight and the ends shall be cut square and true.

The Contractor shall purchase all fiberglass conduit and other fiberglass conduit system components from the same manufacturer to insure component compatibility.

Conduit Sizes: Fiberglass conduit shall be supplied in 20-foot minimum lengths.

System Components: Fiberglass conduit components shall include compatible fittings, adapters, expansion joints, and factory bends at nominal radii of 2, 3, and 4 feet for size 2-inch, 3-inch and 4-inch conduits, respectively.

Material: All fiberglass conduit system components shall be produced from heat cured, corrosion resistant epoxy resin and continuous fiberglass roving. All materials shall be manufactured for use at temperatures from -40° F to 230° F. All fiberglass conduit components shall be manufactured using a homogeneously dispersed UV inhibitor. When exposed to direct diurnal sunlight, the UV inhibitor shall prevent the degradation of all physical material properties, except for surface cosmetic appearance. Materials shall contain no halogens above trace levels and shall be fire resistant.

Joining Method: Joints shall be water tight and withstand a minimum 1,000 pounds of pullout tension.

Stiffness: For all sizes of fiberglass conduit, under a load of 90 pounds per linear foot of conduit, the deflection of the inside diameter shall not exceed 5 percent.

Impact Resistance: The minimum impact resistance values for the fiberglass conduit shall be as follows when measured as described in ASTM Designation: D2444-70, using a 20 pound. tup "B" with a 2-inch radius nose:

2-inch conduit	30 ft•lbs
3-inch conduit	50 ft•lbs
4-inch conduit	80 ft•lbs

HANGERS AND CONCRETE SUPPORTS (BRIDGE)

Wrapping tape for pipe in contact with the earth shall be a pressure sensitive polyvinyl chloride or polyethylene tape with a minimum thickness of 0.050 inches.

Pipe hanger assemblies shall consist of a concrete clevis plate or embedded steel welded linked eye rods, an adjustable steel yoke, a cast iron pipe roller, a steel roller rod and hex nuts. Parts shall be galvanized. The pipe hanger assembly shall be suitable for the type and size of pipe installed and shall be as shown on the plans.

Steel hangers, anchor bolts, pipe clamps, nuts and bolts, and other fittings shall be suitable for the type and size of the supply lines or casing and shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

Concrete pipe supports shall consist of a precast concrete pipe cradle, galvanized steel pipe clamp, 2 anchor bolts and, where shown on the plans, a stainless steel pipe protection shield.

Concrete pipe supports and pipe stops shall conform to the dimensions shown on the plans and shall be constructed of commercial quality concrete with a cement content not less than 595 pounds of portland cement per cubic yard and commercial quality wire mesh. The concrete for pipe supports and pipe stops shall be moist cured for not less than 3 days.

Epoxy adhesive shall conform to the provisions in Section 95-1, "General," of the Standard Specifications and at the option of the Contractor, shall conform to the provisions in Section 95-2.03, "Epoxy Resin Adhesive for Bonding New Concrete to Old Concrete," or in Section 95-2.04, "Rapid Set Epoxy Adhesive for Pavement Markers," or in Section 95-2.05, "Standard Set Epoxy Adhesive for Pavement Markers," of the Standard Specifications.

Full compensation for furnishing and installing mechanical expansion bolt anchors, steel hangers, steel brackets and other fittings, concrete supports, pipe wrapping tape, epoxy-adhesives, and conduit expansion fittings shall be considered as included in the contract price paid per linear foot of two 4" conduit (attached to bridge) involved and no additional compensation will be allowed therefor.

10-3.11 1-1/4-INCH INNERDUCT

Wherever fiber optic cable is used, innerduct shall be installed to provide protection for the fiber optic cable. A separate innerduct shall be installed for each fiber optic cable along the communication mainline as shown on the plans.

All innerduct shall be 1-1/4-inch, smooth, ribbed or corrugated high tensile polyethylene duct. Innerduct shall have the following characteristics:

Inner diameter greater than or equal to 1-1/4-inch, nominal.

Environmental stress crack resistance in excess of 2000 hours at -148° F, no failures.

Cold impact resistance to -105° F not brittle until -148° F.

Minimum tensile strength of 600 pounds for finished product.

Minimum crush strength of 650 pounds.

Coefficient of friction shall be less than 0.4 unlubricated on nonmetallic conduit and with common polyethylene cable jackets.

Different innerducts within the same conduit shall be different colors, and shall be consistent throughout the project. The colors shall be yellow for the 36 SMFO fiber optic cables used for video/data and contrasting color approved by the Engineer for the 12 SMFO for video distribution. The exterior of the innerduct shall be marked with sequential measurement markings each 3 feet.

Innerduct shall be installed using the manufacturer's recommended practices. A manufacturer recommended lubricant shall be applied between the innerduct and the conduit during installation to reduce friction. Innerduct shall be installed using a cable pulling lubricant recommended by the innerduct manufacture and a non-abrasive pull tape conforming to the provisions described under "Conduit" elsewhere in these special provisions. If innerduct is to be installed with adjacent cables in the same conduit, the innerduct and the cable shall be installed together in one operation. Innerduct shall be installed in continuous runs between communication pull boxes and splice vaults without splices or joints.

All ends shall be smoothed to prevent scraping of the cable. A dynamometer shall be used to record installation tension and a tension limiting device shall be used to prevent exceeding the maximum pulling tension during installation. A fusable link shall be used to limit the pulling tension. One link shall be placed in series with every element rated for less than the maximum pulling tension of that element. The innerduct shall not be stressed beyond the minimum bending radius allowed by either the innerduct or fiber optic cable manufacturer.

The tension shall be set to the manufacturer's maximum limit. The maximum pulling tension shall be recorded for each innerduct run.

Immediately prior to installing cables, innerduct shall be blown out with compressed air until all foreign material is removed. After cables have been installed, the ends of innerducts shall be sealed with an approved type of sealing compound.

10-3.12 PULL BOXES

The second paragraph of Section 86-2.06C, "Installation and Use," of the Standard Specifications is amended to read:

The bottoms of pull boxes installed in the ground or in sidewalk areas, shall be bedded in crushed rock as shown on the plans and shall be grouted prior to the installation of conductors. Grout shall be placed in between the pull box and pull box extension as shown on the plans.

Additional pull boxes for communication system routing shall not be installed without the Engineer's written approval. All pull boxes for communication system routing shall be installed in the unpaved area immediately adjacent to the paved shoulder or behind guard rail or to be determined by the Engineer. Communication conduit shall be directed from the shoulder to the boxes with 15 degree (maximum) sweeps. Dikes shall be replaced in kind, as necessary.

Full compensation for replacing the dikes shall be considered as included in the contract price paid per linear foot for the various sizes and types of conduit involved and no additional compensation will be allowed therefor.

Pull boxes of various types, not otherwise covered under lump sum items of work, will be measured as units determined from actual count in place. Pull boxes to be paid for as units shall be those units designated on the plans or ordered by the Engineer.

TRAFFIC PULL BOXES

Attention is directed to Section 86-2.06B, "Cover Marking," and Section 86-2.06C, "Installation and Use," of the Standard Specifications.

Traffic pull boxes and covers shall have a vertical proof-load strength of 25,000 pounds. The 25,000 pound load shall be distributed through a 9" x 9" x 2" steel plate according to Federal Specification RR-F-621e. This load shall be placed anywhere on the box and cover for a period of one minute without causing any cracks or permanent deformations.

The No. 5(T) pull boxes shall be reinforced with a galvanized Z-bar welded frame and cover similar to that shown on the plans for No. 6(T) pull boxes. Frames shall be anchored to the boxes by means of 1/4-inch x 2 1/4-inch long concrete anchors. Six concrete anchors shall be provided for each No. 5(T) and No. 6(T) pull box, one placed in each corner and one placed near the middle of each of the longer sides.

Hold down screws shall be 3/8-inch hex flange cap screws of Type 316 stainless steel. The nut shall be zinc plated carbon steel and shall be made vibration resistant with a wedge ramp at the root of the thread. The nut shall be spot welded to the underside of, or fabricated with, the galvanized Z-bar pull box frame.

Steel covers shall be countersunk approximately 1/4-inch to accommodate the bolt head. The bolt head shall not extend more than 1/8-inch above the top of the cover when tightened. A 1/4-inch tapped hole and brass bonding screw shall be provided.

The opening of traffic pull boxes shall have the following dimensions:

Pull Box Type	Width (±one-inch)	Length (±one-inch)
No. 5(T)	13 inches	24 inches
No. 6 (T)	17 inches	30 inches

Concrete placed around and under traffic pull boxes as shown on the plans shall contain a minimum of 564 pounds of portland cement per cubic yard.

After the installation of traffic pull boxes, steel covers shall be installed and bolted down during periods when work is not actively in progress at the pull box. When placing the steel cover for the final time, the cover and the Z-bar frame shall be cleaned of all debris and securely tightened.

Additional traffic pull boxes shall not be installed without the Engineer's written approval.

Traffic pull boxes shown on the plans in shoulder area are shown for general location only. The exact location shall be outside the paved shoulder. Additional traffic pull boxes shall not be installed without the Engineer's written permission.

COMMUNICATION PULL BOXES

Communication pull boxes and covers shall have a vertical proof-load strength of 25,000 pounds. The 25,000 pounds load shall be distributed through a 9" x 9" x 2" steel plate according to Federal Specification RR-F-621e. This load shall be placed anywhere on the box and cover for a period of one minute without causing any cracks or permanent deformations.

The communication pull boxes shall be reinforced with a galvanized Z-bar welded frame and cover similar to that shown on the plans for No. 6(T) pull boxes. Frames shall be anchored to the boxes by means of 1/4-inch x 2 1/4-inch long concrete anchors. Six concrete anchors shall be provided for each communication pull box, one placed in each corner and one placed near the middle of each of the longer sides.

Hold down screws shall be 3/8-inch hex flange cap screws of Type 316 stainless steel. The nut shall be zinc plated carbon steel and shall be made vibration resistant with a wedge ramp at the root of the thread. The nut shall be spot welded to the underside of, or fabricated with, the galvanized Z-bar pull box frame.

Steel covers shall be countersunk approximately 1/4-inch to accommodate the bolt head. The bolt head shall not extend more than 1/8-inch above the top of the cover when tightened down. A 1/4-inch tapped hole and brass bonding screw shall be provided.

Communication pull boxes shall have " CALTRANS COMMUNICATION" marking on the steel cover.

The opening of communication pull boxes shall have the following dimensions.

Pull Box Type	Width (±one-inch)	Length (±one-inch)
Communication	17 inches	30 inches

Concrete placed around and under communication pull boxes as shown on the plans shall contain a minimum of 564 pounds of cement per cubic yard.

After the installation of communication pull boxes, the steel covers shall be installed and kept bolted down during periods when work is not actively in progress at the pull box. When placing the steel cover for the final time, the cover and the Z-bar frame shall be cleaned of all debris and securely tightened down.

Communication pull boxes shown on the plans in the shoulder are shown for general location only. The exact location shall be outside the paved shoulder and shall be determined by the Engineer.

Communication pull boxes will be measured as units determined from actual count in place. Communication pull boxes to be paid for as units shall be those units designated on the plans or ordered by the Engineer. Additional communication pull boxes shall not be installed without the Engineer written approval.

10-3.13 SPLICE VAULT

Splice vaults shall be 60 inches (L) x 30 inches (W) x 30 inches (D) nominal inside dimensions and shall conform to Section 86-2.06, "Pull Boxes," of the Standard Specifications and these special provisions. Covers shall be in one or two sections. Hold down bolts or cap screws and nuts shall be of brass, stainless steel or other non-corroding metal material. Each cover portion shall have inset lifting pull slots. Cover marking shall be "CALTRANS COMMUNICATION" on each cover section. Enclosures, covers and extensions shall be concrete gray color. Vaults and covers may be constructed of reinforced portland cement concrete or of non-PCC material.

Non-PCC vaults and covers shall be of sufficient rigidity that when a 100-pound concentrated force is applied perpendicularly to the midpoint of one of the long sides at the top while the opposite long side is supported by a rigid surface, it shall be possible to remove the cover without the use of tools. When a vertical force of 1,500 pounds is applied, through a 1/2-inch by 3-inch by 6-inch steel plate, to a non-PCC cover in place on a splice vault, the cover shall not fail and shall not deflect more than 1/4-inch.

Splice vaults shall be installed as detailed and where shown on the plans. Splice vaults and covers shall have an AASHTO HS 20-44 rating, except the splice vaults installed in the following situations, may be rated for AASHTO H5 loads (25 percent of HS 20-44):

- a. Behind structures, retaining walls, barrier railing or guard railing.
- b. In sidewalk areas.
- c. In other areas protected from vehicular traffic as directed by the Engineer.

Splice vaults shall be installed at grade in paved areas, and one-inch above grade in unpaved areas.

Splice vaults shown on the plans in the shoulder are shown for general location only. Exact location shall be outside the paved shoulder.

Metallic or non-metallic cable racks shall be installed on the interior of both sides of the splice vaults. The rack shall be capable of supporting a load of 100 pounds, minimum, per rack arm. Racks shall be supplied in lengths appropriate to the box in which they will be placed. Rack arms shall not be less than 6 inches in length. All metallic cable racks shall be fabricated from ASTM Designation: A36 steel plate and shall be hot-dip galvanized after fabrication. Steel plate, hardware and galvanizing shall be in accordance with the requirements of Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

10-3.14 CONDUCTORS AND WIRING

Splices shall be insulated by "Method B" or, at the Contractor's option, splices of conductors shall be insulated with heat-shrink tubing of the appropriate size after thoroughly painting the spliced conductors with electrical insulating coating.

The minimum insulation thickness, at any point, for Type USE, RHH or RHW wire shall be 1/25 inch for conductor sizes No. 14 to No. 10, inclusive, and 1/18 inch for No. 8 to No. 2, inclusive. The minimum insulation thickness, at any point, for Type THW and TW wires shall be 1/32 inch for conductor sizes No. 14 to No. 10, inclusive, 1/25 inch for No. 8, and 1/18 inch for No. 6 to No. 2, inclusive.

A Certificate of Compliance conforming to the provisions of Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be submitted by the Contractor from the manufacturer to the Engineer for all the conductors and cables furnished for the project.

Section 86-2.08A, "Conductor Identification," of the Standard Specifications is amended to read:

86-2.08A Conductor Identification

Circuit	Signal Phase or Function	Identification			Size
		Insulation Colors ^k		Band	
		Base	Stripe ^a	Symbols ^f	
Vehicle Signals ^d	2,6	Red, Yel, Brn	Blk	2,6	14
	4,8	Red, Yel, Brn	Ora	4,8	14
	1,5	Red, Yel, Brn	None	1,5	14
	3,7	Red, Yel, Brn	Pur	3,7	14
	Ramp Meter 1	Red, Yel, Brn	None	NBR	14
	Ramp Meter 2	Red, Yel, Brn	Blk	NBR	14
Pedestrian Signals ^d	2p,6p	Red, Brn	Blk	2p,6p	14
	4p,8p	Red, Brn	Ora	4p,8p	14
	1p,5p	Red, Brn	None	1p,5p	14
	3p,7p	Red, Brn	Pur	3p,7p	14
Pedestrian Push Buttons ^d	2p,6p	Blu	Blk	P-2,P-6	14
	4p,8p	Blu	Ora	P-4,P-8	14
	1p,5p	Blu	None	P-1,P-5	14
	3p,7p	Blu	Pur	P-3,P-7	14
Traffic Signal Controller Cabinet	Ungrounded between Service	Blk	None	CON-1	6
	Switch & Cabinet	Red	None	CON-2	6
Highway Lighting Pull Box to Luminaire ⁱ	Ungrounded-Line 1	Blk	None	NBR	14
	Ungrounded-Line 2	Red	None	NBR	14
	Grounded	Wht	None	NBR	14
Multiple Highway Lighting	Ungrounded-Line 1	Blk	None	ML1	10
	Ungrounded-Line 2	Red	None	ML2	10
Lighting Control	Ungrounded to PEU	Blk	None	C1	14
	Switching leg from PEU unit or SM transformer	Red	None	C2	14
Multiple Service	Ungrounded-Line 1 (Signals)	Blk	None	NBR ^e	6
	Ungrounded-Line 2 (Lighting)	Red ^j	None	NBR ^e	8
Sign Lighting ^h	Ungrounded-Line 1	Blk	None	SL-1	10
	Ungrounded-Line 2	Red	None	SL-2	10
Flashing Beacons ^g	Ungrounded between Flasher and Beacons	Red or Yel	None	F-Loc. ^c	14
Grounded and Common	Pedestrian Push Buttons	Wht	Blk	NBR	14
	Signals and Multiple Lighting	Wht	None	NBR	10
	Flashing Beacons and Sign Lighting	Wht	None	NBR	12
	Lighting Control	Wht	None	C-3	14
	Multiple Service	Wht	None	NBR	14
Railroad Pre-Emption		Blk	None	R	14
Spares		Blk	None	NBR	14

NBR = No Band Required PEU=Photoelectric unit

- a On overlaps, insulation is striped for first phase in designation. E.g., phase (2+3) conductor is striped as for phase 2.
- b Band for overlap and special phases as required.
- c Flashing beacons having separate service do not require banding.
- d These requirements do not apply to signal cable.
- e "S" if circuit is switched on line side of service equipment by utility.
- f Band conductors in each pull box and near ends of termination points. On signal light circuits, a single band may be placed around 2 or 3 ungrounded conductors comprising a phase.
- g Ungrounded conductors between service switch and flasher mechanism shall be black and banded.
- h Conductors between ballasts and sign lighting lamps shall be No. 16 and color shall correspond to the ballast leads.
- i Both conductors between external high intensity discharge (H.I.D.) ballast and lamp socket shall be black.
- j Black acceptable for size No. 2 and larger. Tape ends for 20" with indicated color.
- k Color Code: Yel-Yellow, Brn-Brown, Blu-Blue, Blk-Black, Wht-White, Ora-Orange, Pur-Purple.

All single conductors and cables, except detector lead-in cables, shall have clear, distinctive and permanent markings on the outer surface throughout the entire length showing the manufacturer's name or trademark, insulation type letter designation, conductor size, voltage rating and the number of conductors in a cable.

Conductor insulation shall be of a solid color or of basic colors with a permanent colored stripe as detailed in the above table unless otherwise specified. Solid or basic colors shall be homogeneous through the full depth of insulation. Identification stripes shall be continuous over the entire length of the conductor. For conductor sizes No. 2 and larger, the insulation may be black and the ends of the conductors shall be taped with electrical insulating tape of the required color for a minimum of 20 inches.

Section 86-2.08B, "Multiple Circuit Conductors," of the Standard Specifications is amended to read:

86-2.08B Multiple Circuit Conductors.— Conductors for multiple circuits shall be UL or ETL listed and rated for 600-V operation. The insulation for No. 14 through No. 4 conductors shall be one of the following:

1. Type TW polyvinyl chloride conforming to the requirements in ASTM Designation: D 2219.
2. Type THW polyvinyl chloride.
3. Type USE, Type RHH or Type RHW cross-linked polyethylene.

At any point, the minimum thickness of any Type TW, THW, USE, RHH or RHW insulation shall be 1/18-inch for conductor sizes No. 14 to No. 10, inclusive, and 1/16-inch for No. 8 to No. 2 inclusive.

The insulation for No. 2 and larger conductors shall be one of the types listed above or shall be Type THWN.

Conductors for wiring wall luminaries and soffits shall be stranded copper, with insulation rated for use at temperatures up to 257° F.

Overhead lighting conductors shall be No. 8, or larger, medium hard drawn copper with weatherproof covering.

The first paragraph of Section 86-2.09, "Wiring," of the Standard Specifications is amended to read:

86-2.09 Wiring.— Conductors shall be run in conduit, except overhead and temporary installations and where conductors are run inside poles. Wiring shall be done in conformance with the regulations and code listed in Section 86-1.02, "Regulations and Code," and the following additional requirements:

The second paragraph of Section 86-2.09A, "Circuitry," of the Standard Specifications is amended to read:

Traffic signal indication conductors shall not run to a terminal block on a standard unless they are to be connected to a signal head that is mounted thereon.

The third paragraph of Section 86-2.09B, "Installation," of the Standard Specifications is amended to read:

When new conductors are to be added or existing conductors are to be removed from existing conduit, all conductors shall be removed; the conduit shall be cleaned as provided in Section 86-2.05C, "Installation," and both old and new conductors, as shown on the plans, shall be pulled into the conduit as a unit.

Section 86-2.09C, "Connectors and Terminals," of the Standard Specifications is amended by adding the following paragraph:

Connectors and terminal lugs for conductor sizes No.8 and smaller shall be soldered by the hot iron, pouring or dipping method. Open flame soldering will not be permitted.

The fifth subparagraph of the first paragraph of Section 86-2.09D, "Splicing and Terminations," of the Standard Specifications is amended to read:

5. Ungrounded traffic signal indication conductors to a terminal compartment or signal head on a standard may be spliced to through conductors of the same phase in the pull box adjacent to the standard.

The first sentence of the tenth paragraph of Section 86-2.09E, "Splice Insulation," of the Standard Specifications is amended to read:

The Contractor may, at the Contractor's option, use either of the following splice insulation methods:

The first and second paragraphs of Section 86-2.10, "Bonding and Grounding," of the Standard Specifications is amended to read:

86-2.10 Bonding and Grounding.— Metallic cable sheaths, metal pull box covers, metal conduit, equipment grounding conductors, ballast and transformer cases, service equipment, sign switches and metal poles and pedestals shall be made mechanically and electrically secure to form a continuous system, and shall be effectively grounded. Bonding jumpers shall be copper wire or copper braid of the same cross sectional area as No. 6 for series lighting systems and No. 8 or larger for all other systems. The jumper size shall be increased to match the load or the circuit breaker size, or shall be as shown on the plans. Equipment grounding conductors shall be color coded to Code requirements or shall be bare.

The bonding jumper in standards with handholes and traffic pull box lid cover shall be attached by a 3/16-inch or larger brass bolt and shall be run to the conduit or bonding wire in the adjacent pull box. Standards without handholes shall be bonded by a jumper attached to all anchor bolts, and shall be run to the conduit or bonding wire in the adjacent pull box. The grounding jumper shall be visible after the cap has been placed on foundation.

The sixth paragraph of Section 86-2.10, "Bonding and Grounding," of the Standard Specifications is amended to read:

For equipment grounding purposes in Type 3 conduit, a No. 6 copper wire shall be run continuously in circuits used for series lighting, and a No. 8, minimum, copper wire shall be run continuously in all other circuits. The bonding wire size shall be increased to match the circuit breaker size, or shall be as shown on the plans. Where Type 3 conduit is to be installed for future conductors, the copper wire may be omitted. Equipment bonding and grounding conductors are not required in conduits which contain only loop lead-in cable or signal interconnect cable or both.

The eighth paragraph of Section 86-2.10, "Bonding and Grounding," of the Standard Specifications is amended to read:

Ground electrodes shall be one-piece, 10-foot, minimum, lengths of galvanized steel rod or pipe not less than 3/4-inch in diameter, or of copper clad steel rod not less than 5/8-inch in diameter. Ground electrodes shall be installed in conformance with the provisions of the Code. The service equipment shall be bonded to the ground electrode by use of a ground clamp or exothermic weld and No. 6 or larger copper wire enclosed in a size 16 or larger diameter conduit.

TWISTED PAIR CABLE

Twisted pair cable shall be supplied in the configurations shown on the plans and specified in these special provisions. The twisted pair cable shall meet the requirements of REA Specification PE-39 and the following:

Conductors shall consist of a solid wire of plain annealed high conductivity copper, smoothly drawn, circular in section, uniform in quality, free from defects and having a conductor size of number 22 AWG. Each conductor shall be insulated with a colored, high density polyethylene jacket.

Insulated conductors shall be uniformly twisted to form pairs. The twisted length of the pairs shall vary to minimize cross talk. A non-hygroscopic dielectric tape shall be wrapped around the insulated pairs. A laid up core shall be wrapped with aluminum tape and bonded with an overlap to provide 100 percent shielding. A black, high molecular weight, medium or low density, polyethylene jacket shall be extruded over the shield. Filling compound materials used in the cable shall not support galvanic action.

The cables shall be color-coded using the REA standard color code.

Packing

The cable shall be supplied on reels. Each reel shall be transported to the site using cable reel trailers and shall have the following information clearly labeled on it:

- Customer.
- Customer order number.
- Reel number.
- Destination.
- Ship date.
- Manufactured date.
- Manufacturer's name.
- Cable code.
- Length of cable.
- Manufacturers Test Data

Cable shall be transported to the project site using cable reel trailers. Care shall be taken at all times to avoid scraping, denting, or otherwise damaging the cable before, during or after installation. Damaged cable shall be replaced by the Contractor without additional compensation.

Installation

Cable shall be installed in duct in the field in accordance with the plans. Duct ends shall have all rough ends smoothed to prevent scraping the cable. A manufacturer recommended lubricant shall be applied to the cable to reduce friction between the cable and the duct. Mechanical aids and pulling cable or ropes shall be used as required. Personnel shall be stationed at each cabinet, splice vault and pull box through which the cable is to be pulled to observe and lubricate the cable. All exposed cable ends shall be protected from moisture ingress.

The cable shall not be stressed beyond the manufacturer's minimum bending radius at any time. A dynamometer shall be used to measure installation tension and a tension limiting device shall be used to prevent exceeding the manufacturer's maximum pulling tension specification during installation. The tension limit shall be set at or below the manufacturer's maximum limit. The maximum measured pulling tension shall be recorded for each run of cable.

A single loop of cable with a minimum length of 6.5 ft, shall be provided at each pull box in accordance with the plans. Cable shall be trained to the splice vault wall opposite any power cables, tied with nylon ties and labeled with vinyl marking bands.

A minimum of 13 ft of slack shall be provided for each unspliced cable at each splice vault.

Following installation of the cable in the duct, all duct entrances at pull boxes, vaults and cabinets shall be sealed with duct sealing compound to prevent the ingress of moisture, foreign materials, and rodents. The cables shall be spliced, maintaining the pair count and REA color code. Cable markers shall be used to identify the cable and pair count. All field splices shall be made in twisted pair splice closures located in the splice vaults. The cable shall be securely fastened in place within pull boxes, vaults and cabinets.

Testing

The Contractor is responsible for all testing and documentation required to establish approval and acceptance of the cable, its installation and in operation during the system integration testing. The following identifies the specific quality control requirements for this specification.

Cables shall be tested at the factory to ensure the cable complies with the manufacturer's specifications. The Contractor shall record the reel number from which the cable came, the identification of the pairs measured, and the results of continuity and insulation tests. Half of the twisted wire pairs in each reel of cable shall be tested for insulation breakdown and continuity prior to installation in ducts.

As a post-installation check, the Contractor shall measure the continuity and insulation resistance of the cable pairs in each length of cable after installation. The Contractor shall measure these parameters on each pair and record and submit the results to the Engineer.

The Contractor shall carry out system integration testing to ensure that the twisted-pair cables perform as specified when used in operation with equipment installed under these special provisions and plans.

Labeling

Labeling of the twisted pair cables shall be in the field cabinets, pull boxes and communication hubs. Twisted pair cables shall be labeled with red tags.

Labeling shall be identified as follows:

LABEL I.D.	LABELING DESCRIPTION
W _ _ _ _ _ DN _ _ _ _ _	WIM, route and Post Mile ; data node, route and Post Mile
H _ _ _ _ _ DN _ _ _ _ _	HAR, route and post mile; data node, route and Post Mile
V _ _ _ _ _ DN _ _ _ _ _	AVC, route and Post Mile; data node, route and Post Mile
J _ _ _ _ _ DN _ _ _ _ _	Census Station, route and Post Mile; data node, route and Post Mile
M _ _ _ _ DN _ _ _ _ _	Modem circuit, circuit number; data node, route and Post Mile
S _ _ _ _ DN _ _ _ _ _ DN _ _ _ _ _	CMS, CMS number; closest data node, route and Post Mile; furthest data node, route and Post Mile
I _ _ _ _ DN _ _ _ _ _	Irrigation, controller direction; data node, route and Post Mile
P _ _ _ _ DN _ _ _ _ _	Pump Station, direction; data node, route and Post Mile
C _ _ _ _ DN _ _ _ _ _	Camera control, direction; data node, route and Post Mile
B _ _ _ _ DN _ _ _ _ _	Beacon, direction; data node, route and Post Mile
A _ _ _ _ DN _ _ _ _ _	Automated Weather Station, direction; data node, route and Post Mile

10-3.15 TERMINAL BLOCK

The protected terminal blocks shall have replaceable protector modules and be installed in equipment cabinets.

Terminal Blocks - 12 Pair--Terminal blocks shall terminate twisted-pair communication cables and each pair shall terminate on distinct terminals using either punch-down or compression, screw-down terminals. Each terminal blocks shall terminate 12 pairs as shown on the plans. The terminal blocks shall include solid state, over-voltage protection consistent with REA Telecommunication Bulletin 344-2 or Bellcore TR-TSY-000299.

The terminals shall terminate wire sizes from No. 22 AWG to No. 18 AWG, and have a current rating of not less than 2 A. Terminal blocks installed in field equipment cabinets, including but not limited to, ramp metering and traffic monitoring (count) stations, changeable message sign, census station and CCTV camera locations, shall be 12-pair protected terminal blocks. Terminal blocks shall be installed at data nodes, video nodes and cable nodes, and shall be protected premises entry type, and use an AT&T, 4C-S, 5-pin plug-in type protector or equivalent.

Terminal blocks shall be systematically arranged inside the cabinet to allow termination of cables. The terminal block and the station-protection modules shall be properly installed along the lower side of the equipment cabinet, opposite the power terminations.

Each pair of the incoming twisted-pair communication cables shall be properly terminated inside the equipment cabinet as indicated in the schematics and twisted-pair splice tables. Terminations shall be made sequentially and no more than one wire from the communication cable shall be connected to one terminal and marked properly to show the pair number.

All cable cores shall be labeled with cable markers at each end for proper core identification.

Terminal Protector.--The terminal protector incorporated in the terminal blocks shall be field installable and replaceable solid state over-voltage protection (SSOVP) module. The SSOVP shall have tin-alloy plated outside plant, central office and grounding pins. The SSOVP will operate in the 300 VDC surge range with a response time of less than 20 ns.

The solid-state over-voltage protection (SSOVP) module is a 5-pin unit that will be installed in a C-310 style terminal block. The SSOVP will have an on-state voltage of less than 5 V at 100 A within 10 μ s.

Existing protected terminal blocks of the size shown on the plans and where a new twisted pair cable is to be terminated shall be terminated in a similar methods required for new 12 pair terminal blocks as described above.

Full compensation for terminal blocks shall be considered as included in the per unit price and the contract lump sum price paid for the items requiring the terminal blocks and no additional compensation will be allowed therefor.

10-3.16 TWISTED PAIR SPLICE CLOSURE

Twisted-pair splice closures shall come in two sizes; twelve inches and twenty-four inches. The closures shall be installed inside communication pull boxes or splice vaults for every drop from the twisted-pair trunk cable to an equipment location and at mid-span splices as shown on the plans and shall conform to the following.

The twisted-pair splice closure shall consist of a neoprene sleeve, and shall be secured with hose clA.

The twisted-pair splice closure shall have external dimensions not exceeding 24 inches in length by 3 inches in diameter. In the communication pull boxes and splice vaults, the length shall be limited to 12 inches. The twisted-pair splice closure shall consist of a neoprene sleeve, and shall be secured with hose clA. The closure shall protect the cable splices from water and mechanical damage and shall be resistant to salt corrosion. All material of the twisted-pair splice closure and associated mounting accessories shall be non-reactive and the completed assembly shall not support galvanic cell action. The twisted-pair splice closure shall be waterproof, encapsulated with re-enterable material, and shall be sealed with a gasket. Wire connections shall be of the insulation displacement type with water blocking gel, (3-M Scotchlocks, AMP Pica-bonds or equivalent). The manufacturer's instructions shall be explicitly followed during installation of the twisted-pair splice closure.

The closure shall be mounted securely inside the communication pull box or vault as shown on the plans. The closure shall be properly grounded and the cable sheaths bonded using bonding clA. The trunk cables shall be identified as "IN" or "OUT" depending upon their location relative to the splice (toward the communication node or away from the communication node). A tape collar shall be placed around the two trunk cables and the drop cable at the location required by the splice closure. The splice closure shall be fitted to the splice and the hose clA tightened over the cables.

Each pair of the drop cable shall be properly spliced to the designated pair in the trunk cable as indicated in the twisted-pair splice tables. The splice conductors shall be securely crimped onto the wires, using manufacturer approved installation tools.

The closures shall be provided along with a splice kit, which shall contain all hardware items. Hardware shall include, but not be limited to, vinyl tape, bonding clA, splice connectors, No. 14 AWG, insulated wire, spacer tapes, and terminal lugs.

Continuity shall be tested and confirmed prior to final assembly of the splice closure. After installing, splicing, and terminating the twisted-pair communication cables the Contractor shall test the cables for grounds, shorts, splits, and opens. The Contractor shall measure and record the loop resistance from the adjacent data node for all pairs at each terminal location. This resistance shall not exceed 34 Ω per 1,000 ft, the Contractor shall record all data and shall correct any problems per manufacturer's instruction. The Contractor shall record all data for review by the Engineer.

Full compensation for twisted pair splice closure shall be considered as included in the per unit price and the contract lump sum price paid for the items requiring the twisted pair splice closures and no additional compensation will be allowed therefor.

10-3.17 STATE-FURNISHED CHANGEABLE MESSAGE SIGN WIRING HARNESS NO. 4 AND 5

Changeable message sign wiring harness No. 4 and 5 (4P18 and 24P18) to be installed, as shown on the plans for the changeable message sign (CMS), will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

The cable shall not be stressed beyond the manufacturer's minimum bending radius at any time. A dynamometer shall be used to measure installation tension and a tension limiting device shall be used to prevent exceeding the manufacturer's maximum pulling tension specification during installation. The tension on the tension limiting device shall be set at or below the manufacturer's maximum recommended pulling tension. The maximum measured pulling tension shall be recorded for each run of cable.

A single loop of cable with a minimum length of 10 feet shall be provided at each pull box in accordance with the plans. Cable shall be trained to the splice vault wall opposite any power cables tied with nylon ties and labeled with vinyl marking bands.

The Contractor shall carry out system integration testing to ensure that the communication cables perform as specified when used in operation with equipment installed under these special provisions and plans.

10-3.18 SERVICE

Continuous welding of exterior seams in service equipment enclosures is not required.

Overlapping exterior seams and doors shall meet the requirements for Type 3R enclosures specified in the NEMA Enclosure Standards.

The fifth sentence of the seventh paragraph of Section 86-2.11, "Service," of the Standard Specifications is amended to read:

Multiple-pole breakers shall be the internal trip type.

A barrier type terminal block rated for 40 A, minimum, shall be provided in each service equipment enclosure. The terminal block shall have a minimum of 12 positions with terminals rated at Size No. 8 or larger, to accept the field wires indicated on the plans. Field wires shall be terminated using crimped, insulated loop connectors.

The ninth paragraph of Section 86-2.11, "Service," of the Standard Specifications is amended to read:

Types II and III service equipment enclosures shall be fabricated from galvanized sheet steel, or fabricated from sheet steel and zinc or cadmium plated after fabrication, or shall be fabricated from aluminum. Fabrication of service equipment enclosures shall conform to the provisions in Section 86-3.04A, "Cabinet Construction." Steel enclosures shall be painted in conformance with the provisions in Section 86-2.16, "Painting." Overlapping exterior seams and doors shall meet the requirements for Type 3R enclosures specified in the NEMA Enclosure Standards.

Each service shall be provided with up to 2 main circuit breakers which shall disconnect ungrounded service entrance conductors. Where the "Main" circuit breaker consists of 2 circuit breakers as shown on the plans or required in the special provisions, each of the circuit breakers shall have a minimum interrupting capacity of 10,000 amperes, rms.

An engraved phenolic nameplate shall be installed with stainless steel rivets on the exterior of the front panel indicating the identification number and the service address of the service cabinet enclosure. Character size shall be a minimum of 5 mm in height.

Service conduits between the utility owned power poles and the service equipment enclosures shall not be installed until service locations have been verified by the serving utility.

Where a new service is to be installed, the Contractor shall notify the Engineer in writing at least five working days prior to the date service is required.

Full compensation for Type III-BF and Type III-CF service equipment enclosure shall be considered as included in the contract lump sum price paid for the various items requiring service equipment enclosure as shown on the plans, and no additional compensation will be allowed therefor.

ELECTRIC SERVICE (IRRIGATION)

Electric service (irrigation) shall be from the service points to the irrigation controllers (IC) and to the spaces provided in the irrigation controller enclosure cabinets (CEC) for irrigation controllers, as shown on the plans.

The types of service for the irrigation controllers and irrigation controller enclosure cabinets shall conform to the following:

IRRIGATION CONTROLLERS (IC) C and D.--A single-pole, 20-ampere circuit breaker shall be installed in the existing service equipment enclosure. The circuit breaker shall be of the same manufacturer and model and interrupting capacity as the existing circuit breakers.

IRRIGATION CONTROLLERS (IC) A through F.--Electric service (irrigation) for irrigation controllers A through F shall be 120 volts obtained from the existing pull box.

Electric service (irrigation) will be paid on a lump sum basis.

10-3.19 NUMBERING ELECTRICAL EQUIPMENT

Self-adhesive reflective numbers and edge sealer will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

The numbers and edge sealer shall be placed on the equipment where designated by the Engineer.

Where new numbers are to be placed on existing or relocated equipment, the existing numbers shall be removed.

Reflective numbers shall be applied to a clean surface. Only the edges of the numbers shall be treated with edge sealer.

Five-digit, self-adhesive equipment numbers shall be placed for all electroliers, soffit lighting, sign lighting, and service pedestals. On service pedestals, the numbers shall be placed on the front door. On electroliers, the numbers shall be placed as shown on the plans.

Numbers for illuminated signs mounted on overcrossings or for soffit luminaires shall be placed on the nearest adjacent bent or abutment at approximately the same station as the sign or soffit luminaire. Where no bent or abutment exists near the sign or soffit luminaire, the number shall be placed on the underside of the structure adjacent to the sign or soffit luminaire. Arrangement of numbers shall be the same as those used for electroliers.

10-3.20 MODEL 170 TYPE 334-TV CONTROLLER ASSEMBLIES

Model 170 Type 334 -TV controller assemblies for closed circuit television system shall be furnished by the Contractor and shall conform to the provisions in Section 86-3.03, "Model 170 and Model 2070 Controller Assemblies," of the Standard Specifications and these special provisions.

The Contractor shall arrange to have a signal technician, qualified to work on the controller unit and employed by the controller unit manufacturer, or the manufacturer's representative, present at the time the equipment is turned on.

The Contractor shall construct each controller cabinet foundation as shown on the plans for Model 332 and 334 cabinets (including furnishing and installing anchor bolts), shall install the controller cabinet on the foundation, and shall make field wiring connections to the terminal blocks in the controller cabinet.

Foundations for Type 1 housing shall conform to the details on Standard Plan ES-3C for Model 332 and 334 cabinets.

10-3.21 STATE-FURNISHED MODEL 170 TYPE 334 CONTROLLER ASSEMBLIES

The Model 170 Type 334 controller assemblies, including controller unit, completely wired controller cabinet and inductive loop detector sensor units, but without anchor bolts, for ramp metering and traffic monitoring station systems will be State-furnished as provided under "Materials" of these special provisions.

The Contractor shall construct each controller cabinet foundation as shown on the plans for Model 334 cabinets (including furnishing and installing anchor bolts), shall install the controller cabinet on the foundation, and shall make field wiring connections to the terminal blocks in the controller cabinet.

A listing of field conductor terminations, in the State-furnished controller cabinet, will be furnished free of charge to the Contractor at the site of the work.

State forces will maintain the controller assemblies. The Contractor's responsibility shall be limited to conforming to the provisions in Section 6-1.02, "State-Furnished Materials," of the Standard Specifications.

10-3.22 RELOCATE TRAFFIC MONITORING STATION AND RAMP METERING SYSTEM CONTROLLER ASSEMBLIES

Relocate traffic monitoring station and ramp metering system controller assemblies shall consist of relocating Model 170 controller Type 334 and Type 334-C assemblies, including controller unit, completely wired controller cabinet and furnishing and installing new anchor bolts.

The Contractor shall relocate each controller cabinet foundation as shown on the plans for Model 334 and 334-C, shall relocate the controller cabinet on new foundation, and shall make field wiring connections to the terminal blocks in the controller cabinet.

10-3.23 IRRIGATION CONTROLLER ENCLOSURE CABINET

Irrigation controller enclosure cabinets (CEC) shall be constructed and the equipment within the cabinets shall be installed in conformance with the details shown on the plans, the provisions in the Standard Specifications, and these special provisions. Irrigation controller enclosure cabinet shall have the following features:

1. A closed cell neoprene gasket around door.
2. A stainless steel full length door hinge.
3. Welded construction fabricated from 12-gage Type 304 stainless steel.
4. Louver ventilation.
5. Padlock shield.
6. Size shall be 35 inch (H) x 23 inch (W) x 11 inch (D) for single enclosure.
7. The controller enclosure cabinet shall be bolted to the concrete foundation as recommended by the manufacturer.

A padlock with a removable core mortise cam cylinder shall be installed with the lock core for the irrigation controller enclosure cabinet. The cam cylinder shall be capable of receiving the State's lock core. The State's lock core is a "Best" No. 21B72 construction core. Keys shall be removable from the locks in the locked position only. Two keys for each door lock shall be delivered to the Engineer.

The padlock shackle shall be 3/4 inch in height and 5/16 inch diameter and shall have a 7-pin housing. Padlock shall be corrosion resistant and have a dust cover.

Irrigation controller enclosure cabinet doors shall not be furnished with integral door locks.

The plywood mounting panel shall be 3/4 inch exterior AC grade veneer plywood. The panel shall be painted with one application of an exterior, latex based, wood primer and 2 applications of an exterior, vinyl acrylic enamel, white in color. The plywood panel shall be painted on all sides and edges prior to installation of the panel in the cabinet and equipment on the panel.

Inside of the doors shall have provisions for storage of irrigation plans.

Duplex convenience receptacles shall have ground-fault circuit interruption as defined by the Code. Circuit interruption shall occur on 6 mA of ground-fault current and shall not occur on less than 4 mA. Receptacles shall be installed in a weatherproof housing with rainproof lift covers.

A solid-state automatic shut-off rain sensor units shall be installed for irrigation controller enclosure cabinets. The rain sensor units shall automatically interrupt the master remote control valves after approximately 1/8 inch of rain has fallen. The irrigation system shall automatically be enabled again when the accumulated rainfall evaporates from the rain sensor unit collection cup. Rain sensor units shall be rated 24 to 30 volts, AC. Static charge protection shall be included to protect against lightning damage.

All equipment, except for field wiring, shall be installed in the irrigation controller enclosure cabinet in a shop prior to field installation.

Irrigation controller enclosure cabinets will be measured by the unit as determined from actual count in place.

10-3.24 VEHICLE SIGNAL FACES AND SIGNAL HEADS

Lamps for vehicular traffic signal units will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

Section 86-4.01, "Vehicle Signal Faces," of the Standard Specifications is amended by adding the following paragraph:

Top openings of signal faces shall be sealed with neoprene gaskets.

Section 86-4.01A, "Optical Units," of the Standard Specifications is amended to read:

86-4.01A Optical Units.--Each optical unit for yellow and green section shall consist of a lens, a reflector or reflector assembly, a lamp receptacle and a clear traffic signal lamp, conforming to the following:

Lenses, reflectors, reflector assemblies, lamp receptacles, lamps, wiring and light distribution shall conform to the requirements in ITE Publication: ST-008B.

Each lens shall be of best quality glass, true to color and free of imperfections.

All reflectors shall conform to the requirements in ITE Publication: ST-008B except that reflectors shall be made of silvered glass or of specular aluminum with an anodic coating. Reflector ring holder shall be made of cast aluminum.

A single piece formed metal reflector ring holder may be used.

Each optical unit for red sections shall conform to the provisions in Section 86-4.02, "Light Emitting Diode Signal Module."

The first paragraph of Section 86-4.01C, "Electrical Components," of the Standard Specifications is amended to read:

86-4.01C Electrical Components.— Lamp receptacles and wiring shall conform to ITE Publication: ST-008B. The metal portion of the medium base lamp socket shall be brass, copper or phosphor bronze.

The first paragraph of Section 86-4.01D, "Visors," of the Standard Specifications is amended to read:

86-4.01A Visors.— Each signal section shall be provided with a removable visor conforming to the requirements in ITE Publication: ST-008B. Visors are classified, on the basis of lens enclosure, as full circle, tunnel (bottom open), or cap (bottom and lower sides open). Unless otherwise specified, visors shall be the tunnel type.

The sixth paragraph of Section 86-4.03, "Backplates," of the Standard Specifications is amended to read:

In lieu of the screws shown on the plans, plastic backplates may be fastened to the plastic signal face using self-threading No. 10 steel screws. The screws shall have an integral or captive flat washer and a hexagon head slotted for a standard screwdriver, and shall be stainless steel or steel with a zinc or black oxide finish.

The first paragraph of Section 86-4.06, "Signal Mounting Assemblies," of the Standard Specifications is amended to read:

86-4.06 Signal Mounting Assemblies.— Signal mounting assemblies shall consist of 1½ inch standard steel pipe or galvanized conduit, necessary fittings, slip-fitters and terminal compartments. Pipe fittings shall be ductile iron, galvanized steel, aluminum alloy Type AC-84B No. 380, or bronze. Mast arm slip-fitters, post top slip-fitters and terminal compartments shall be cast bronze or hot-dip galvanized ductile iron. After installation any exposed threads of galvanized conduit brackets and areas of the brackets damaged by wrench or vise jaws shall be cleaned with a wire brush and painted with 2 applications of approved unthinned zinc-rich primer (organic vehicle type) conforming to the requirements in Section 91, "Paint." Aerosol cans shall not be used.

Section 86-4, "TRAFFIC SIGNAL FACES AND FITTINGS" of the Standard Specifications is amended by adding the following sections:

86-4.08 Light Emitting Diode Signal Module.— The 12-inch red sections, the 8-inch red sections and the red arrow sections traffic signal faces shall utilize light emitting diode signal modules. Each light emitting diode signal module shall consist of an assembly that utilizes light emitting diodes as the light source. Each light emitting diode signal module shall be designed to be installed in the door frame of a standard traffic signal housing.

Light emitting diode signal modules shall be from the same manufacturer and each size shall be the same model.

Light emitting diode signal modules shall be sealed units with 2 conductors for connecting to power, a printed circuit board, a power supply, a red lens and gasket, and shall be weatherproof after installation and connection. The circuit board and power supply shall be contained inside the light emitting diode signal module. Circuit boards shall conform to Chapter 1, Section 6, of the "Transportation Electrical Equipment Specifications" published by the State of California, Department of Transportation.

Conductors for light emitting diode signal modules shall be 3 feet in length, with terminals attached, and shall conform to the provisions in Section 86-4.01C, "Electrical Components."

Connections shall be to the terminal block in the signal face or shall utilize an adapter that screws into the medium base lamp socket. Contacts shall be brass. Splices will not be allowed.

The lens of the light emitting diode signal module shall be integral to the unit, shall be convex with a smooth outer surface and shall be made of ultraviolet stabilized plastic or glass. The lens shall be capable of withstanding ultraviolet (UV) (direct sunlight) exposure for a minimum period of 48 months without exhibiting evidence of deterioration.

The light emitting diode signal module shall be sealed in the door frame with a one-piece ethylene propylene rubber (EPDM) gasket.

The light emitting diodes shall utilize Aluminum Indium Gallium Phosphate (AlInGaP) technology and shall be the ultra bright type or equivalent rated for 100,000 hours of continuous operation from -40° F to +165° F.

The individual light emitting diodes shall be wired such that physical damage or the failure of one light emitting diode will result in the loss of not more than 5 percent of the light emitting diode signal module light output.

Maximum power consumption requirements for light emitting diode signal modules shall be as follows:

LED Signal Module	Power Consumption	
	77° F	165° F
12-inch Circular	25.0 W	30.0 W
8-inch Circular	15.0 W	18.0 W
12-inch Arrow	15.0 W	18.0 W

Light emitting diode signal modules shall be rated for a minimum useful life of 48 months.

86-4.08A Physical and Mechanical Requirements.--Light emitting diode signal modules shall be designed as retrofit replacements for optical units of standard traffic signal sections and shall not require special tools for installation. Light emitting diode signal modules shall fit into existing traffic signal section housings built in conformance with the requirements in the Institute of Transportation Engineers (ITE) publication ST-008B, "Vehicle Traffic Control Signal Heads (VTCSH)" without modification to the housing.

Installation of light emitting diode signal modules shall not require the removal of material in the traffic signal section except the optical unit components, that is, lens, gaskets, lamp, lamp socket and reflector. Installed light emitting diode signal modules shall fit securely in the door frame and shall be weathertight.

Light emitting diode signal modules shall have a maximum weight of 4.4 pounds.

The lens may be tinted or may use transparent film or materials with similar characteristics to enhance "ON/OFF" contrasts. The use of tinting or other materials to enhance "ON/OFF" contrasts shall not affect chromaticity and shall be uniform across the face of the lens.

If a polymeric lens is used, a surface coating or chemical surface treatment shall be used to provide front surface abrasion resistance.

Light emitting diode signal modules shall be rated for use in the operating temperature range of -40° F to +165° F.

Light emitting diode signal modules shall be protected against dust and moisture intrusion in conformance with the requirements in NEMA Standard 250-1991 for Type 4 enclosures to protect the internal components.

Light emitting diode signal modules shall be single, self-contained devices, not requiring on-site assembly for installation into existing traffic signal housing. The power supply for the light emitting diode signal module shall be integral to the unit.

The light emitting diode signal module assembly shall be manufactured to withstand mechanical shock and vibration from high winds and other sources.

Enclosures containing either the power supply or electronic components of light emitting diode signal modules shall be made of UL94VO flame retardant materials. The lens of the light emitting diode signal module is excluded from this specification.

Each light emitting diode signal module shall have the manufacturer's name, trademark, model number, serial number, lot number and the month and year of manufacture permanently marked on the back of the light emitting diode signal module.

The following operating characteristics shall be identified: rated voltage, power consumption and volt-ampere (VA).

Each light emitting diode signal module shall have prominent and permanent vertical markings for correct indexing and orientation within a signal housing. The markings shall consist of an "UP" arrow, or the word "UP" or "TOP".

86-4.08B Photometric Requirements.--The minimum initial luminous intensity values for light emitting diode signal modules shall conform to the requirements in Section 11.04 of the Institute of Transportation Engineers (ITE) publication ST-008B, "Vehicle Traffic Control Signal Heads (VTC SH)" at 77°F.

Light emitting diode signal modules shall meet or exceed 85 percent of the standard light output values specified in the VTC SH, after 48 months of continuous use over the temperature range of -40° F to +165° F in a traffic signal operation.

The measured chromaticity coordinates of light emitting diode signal modules shall conform to the requirements for chromaticity in Section 8.04 and Figure 1 of the VTC SH over the temperature range of -40° F to +165° F.

In addition to the specifications for circular light emitting diode signal modules, light emitting diode red arrow signal modules shall conform to the following:

The light emitting diode red arrow signal module indication shall conform to the requirements in Section 9.01 of the VTC SH for arrow lenses. The light emitting diodes shall be spread evenly across the illuminated portion of the arrow area. Each light emitting diode signal section indication shall provide an average luminous intensity of 511 cd/ft². Measurements shall be performed at rated operating voltage of 120 V(ac).

86-4.08C Electrical.--Light emitting diode signal modules shall operate over a voltage range from 95 V to 135 V(ac) at a frequency of 60 Hz ±3 Hz. The light emitting diode circuitry shall prevent perceptible flicker over the specified voltage range. The fluctuations of line voltage shall have no visible effect on the luminous intensity of the indications. Rated voltage for the measurements shall be 120 V.

Wiring and terminal blocks shall conform to the requirements in Section 13.02 of the VTC SH. Two secured, color coded, 600 V, 20 AWG minimum, jacketed wires, conforming to the National Electric Code, rated for service at or greater than 221° F, are to be provided for electrical connection for each light emitting diode signal module.

The light emitting diode signal module on-board circuitry shall include voltage surge protection to withstand high-repetition noise transients as specified in Section 2.1.6 of NEMA Standard TS2-1992.

Light emitting diode signal modules shall be operationally compatible with currently used controller assemblies (solid-state load switches, flashers and conflict monitors).

Light emitting diode signal modules and associated on-board circuitry shall meet Federal Communication Commission (FCC) Title 47, SubPart B, Section 15 regulations concerning the emission of electronic noise.

Light emitting diode signal modules shall provide a power factor of 0.90 or greater while operating throughout the temperature range of -40° F to +165° F.

Total harmonic distortion (current and voltage) induced into an AC power line by a light emitting diode signal module shall not exceed 20 percent while operating throughout the temperature range of -40° F to +165° F.

86-4.08D Testing.--The light emitting diode signal modules tested or submitted for testing shall be representative of typical average production units. Circular light emitting diode signal modules shall be tested in conformance with the requirements in California Test 604. Optical testing shall be performed with the light emitting diode signal module mounted in a standard traffic signal section but without a visor or hood attached to the signal section.

86-4.08D(1) Design Qualification Testing.--Design Qualification Testing shall be performed by the manufacturer on new light emitting diode signal module designs, and on an existing design when a major design change has been implemented.

A quantity of 2 units for each design shall be submitted for Design Qualification Testing. Test units shall be submitted to the Transportation Laboratory, after the manufacturer's testing is complete.

Manufacturer's test data shall be submitted with test units for Transportation Laboratory verification of Design Qualification Testing data.

The sample light emitting diode signal modules shall be energized for a minimum of 24 hours, at 100 percent on-time duty cycle, at or greater than 165° F before performing Design Qualification Testing. For Design Qualification Testing, parameters measured shall include but not be limited to:

The luminous intensity measurements shall be taken over the temperature range of -40° F to +165° F.

Color requirements shall be measured while operating throughout the temperature range of -40° F to +165° F.

Specified parameters shall be measured and used for quality comparison of Production Quality Assurance current measurement on production light emitting diode signal modules.

Light emitting diode signal modules shall be tested for compatibility with the controller unit, conflict monitor and load switch. Each light emitting diode signal module shall be connected to the output of a standard load switch connected to a voltage supply between the values of 95 V(ac) and 135 V(ac) with the input to the load switch in the "OFF" position. The voltage developed across each light emitting diode signal module so connected shall not exceed 10 V rms as the input AC voltage is varied from 95 V(ac) rms to 135 V(ac) rms.

Mechanical vibration testing shall conform to the requirements in Military Specification MIL-STD-883, Test Method 2007, using 3 four-minute cycles along each x, y and z axis, at a force of 2.5 g, with a frequency sweep from 2 Hz to 120 Hz. The loosening of the lens, of internal components or other physical damage shall be cause for rejection.

Temperature cycling shall be performed in conformance with the requirements in Military Specification MIL-STD-883, Test Method 1010. The temperature range shall be according to "Environmental Requirements." A minimum of 20 cycles shall be performed with a 30 minute transfer time between temperature extremes and a 30-minute dwell time at each temperature. Light emitting diode signal modules shall be tested under operating conditions. Failure of a light emitting diode signal module to function properly or evidence of cracking of the light emitting diode signal module lens or housing after temperature cycling shall be cause for rejection.

Moisture resistance testing shall be performed on light emitting diode signal modules in conformance with the requirements in NEMA Standard 250-1991 for Type 4 enclosures. Evidence of internal moisture after testing shall be cause for rejection.

86-4.08D(2) Production Quality Control Testing.--The following Production Quality Control tests shall be performed on each new light emitting diode signal module prior to shipment:

A single point measurement with a correlation to the intensity requirements of Section 1.04 of the VTCSH may be used.

The ambient temperature for this measurement shall be greater than 77° F.

Each light emitting diode signal module not meeting minimum luminous intensity requirements according to Table 1 of VTCSH for circular indications, or 511 cd/ft² for arrow indications shall be rejected. The manufacturer shall retain test results for 7 years.

For the burn-in period, each light emitting diode signal module shall be energized at rated voltage for a 30 minute stabilization period before the measurement is made.

Each light emitting diode signal module shall be tested for rated initial intensity after burn-in.

Each light emitting diode signal module shall be tested for required power factor after burn-in.

Each light emitting diode signal module shall be measured for current flow in amperes after burn-in. The measured current values shall be compared against rated values resulting from design qualification measurements under "Design Qualification Testing." The current flow shall not exceed the rated value. The measured ampere values with rated voltage shall be recorded as volt-ampere (VA) on the product labels.

Each light emitting diode signal module shall be visually inspected for exterior physical damage or assembly anomalies. Careful attention shall be paid to the surface of the lens to ensure that no scratches, abrasions, cracks, chips, discoloration or other defects are apparent. Defects shall be cause for rejection.

86-4.08D(3) Production Quality Assurance Testing.--Production Quality Assurance Tests may be performed on each new light emitting diode signal module. The number of units tested (sample size) shall be determined by the quantity of each model in the shipment. The sample size shall conform to the requirements of American National Standard Institute/Acceptance Sampling in Quality Control, ANSI/ASQC Z1.4.

The State will determine the sampling parameters to be used for the random sample testing.

Specified parameters may be tested on the sample.

Acceptance or rejection of the shipment shall conform to the requirements in ANSI/ASQC Z1.4 for shipments which are sampled randomly.

Upon rejection of the shipment, the vendor shall arrange for pick-up of the shipment at no cost to the State.

86-4.08D(4) Certificate of Compliance.--The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance." The certificate shall certify that the light emitting diode signal modules comply with the requirements in these specifications. The certificate shall also include a copy of applicable test reports on the light emitting diode signal modules.

10-3.25 DETECTORS

Loop detector sensor units will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

Loop detector lead-in cable shall be Type B.

Inductive loop detector shall be Type E. For Type E detector loops, sides of the slot shall be vertical and the minimum radius of the slot entering and leaving the circular part of the loop shall be 1 1/2 inches. Slot width shall be a maximum of 3/4-inch. Loop wire for circular loops shall be Type 2. Depth of slots of circular loops shall not to exceed the depth of pavement as shown on the plans and shall be filled with hot melt rubberized asphalt sealant. Inductive loop detector shall be installed only after pavement stripping is completed.

The depth of loop sealant above the top of the uppermost loop wire in the sawed slots shall be as shown on the plans. The saw cut depth shall have a maximum, as shown in the plans.

Slots in portland cement concrete shall be filled with elastomeric sealant or hot-melt rubberized asphalt sealant, or shall be filled with an epoxy sealant conforming to the provisions in Section 95-2.09, "Epoxy Sealant for Inductive Loops (State Specification 8040-06)," of the Standard Specifications.

The second paragraph of Section 86-5.01, "Vehicle Detectors," of the Standard Specifications is amended to read:

All sensor units, control units and amplifiers shall conform to the provisions for the TEES as specified in Section 86-3.03, "Model 170 and Model 2070 Controller Assemblies." The units shall not be affected by transient voltages when tested in conformance with the requirements in California Test 667.

The third paragraph of Section 86-5.01A(5), "Installation Details," of the Standard Specifications is amended to read:

Slots cut in the pavement shall be washed clean, blown out and thoroughly dried before installing conductors. Residue resulting from slot cutting operations shall not be permitted to flow across shoulders or lanes occupied by public traffic and shall be removed from the pavement surface by vacuuming or other approved method before any residue flows off of the pavement surface. Residue from slot cutting operations shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13.

The sixth paragraph of Section 86-5.01A(5), "Installation Details," of the Standard Specifications is amended to read:

Loop conductors shall be installed without splices and shall terminate in the nearest pull box. In addition to the requirements for splices in detector circuits, the open end of cable jackets or tubing shall be sealed in a manner similar to the splicing requirements to prevent the entrance of water. The loops shall be joined in the pull box in combination of series and parallel so that optimum sensitivity is obtained at the sensor unit. Final splices between loops and lead-in cable shall not be made until the operation of the loops under actual traffic conditions is approved by the Engineer.

10-3.26 MICROWAVE VEHICLE DETECTION SENSOR

The microwave vehicle detection sensor (MVDS) shall consist of all microwave detector units, connectors, cables, junction boxes, mounting equipment, software, firmware, power supply units and all other support equipment.

Functional Requirements.--The MVDS signal shall emulate the response of an inductive loop detector. The MVDS units shall be tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. Each MVDS unit shall operate independently and not interfere with other MVDS units installed as part of this project.

The microwave sensor unit shall operate in the frequency of $10.525 \text{ GHz} \pm 25 \text{ Hz}$. The transmitter power shall be a maximum of 10 mW.

The MVDS field of view shall be covered by a maximum detection range defined as follows:

Elevation beam-width	45 degrees
Azimuth beam-width	15 degrees
Range	100 to 200 feet

Each MVDS unit shall have the capability of providing a minimum of 8 detection zones within each beam footprint. The size of each zone shall be user definable with a maximum range resolution of 6.5 feet. The minimum footprint shall be greater than or equal to 6 feet.

The time of events shall be measured in a maximum of 10-ms resolution.

Measurement accuracy shall be better than 95 percent certainty for vehicle presence.

Each MVDS unit shall be supplied with a connectorized MVDS cable harness with appropriate cable length for each installation. The cable shall consist of 15 unshielded twisted pairs of No. 20 conductors with an overall shield. Each conductor shall have a minimum of 19 tinned copper strands with a minimum of 0.06-inch PVC insulation rated for 300 V at 221° F. The outer jacket shall be chrome PVC with a minimum thickness of 0.06-inch. The outside diameter of the cable shall not exceed 3/4-inch. The connector shall be MS3476@18-32S or equivalent. The connector shall include contacts for powering the sensor unit, RS-232 serial data communication and contact pairs for each detection zone. The connector pinout is as follows:

No.	Pin No.	Designation	Signal	Remark
1	A	Contact Closure	Opto 1	Not used
2	B	Contact Closure	Opto 1 Return	Not used
3	C	Contact Closure	Opto 2	Not used
4	D	Contact Closure	Opto 2 Return	Not used
5	E	Contact Closure	Opto 3	Not used
6	F	Contact Closure	Opto 3 Return	Not used
7	G	Contact Closure	Opto 4	Not used
8	H	Contact Closure	Opto 4 Return	Not used
9	J	Contact Closure	Opto 5	Not used
10	K	Contact Closure	Opto 5 Return	Not used
11	L	Contact Closure	Opto 6	Not used
12	M	Contact Closure	Opto 6 Return	Not used
13	N	Contact Closure	Opto 7	Not used
14	P	Contact Closure	Opto 7 Return	Not used
15	R	Contact Closure	Opto 8	Not used
16	S	Contact Closure	Opto 8 Return	Not used
17	d	Contact Closure	Opto 9	Not used
18	e	Contact Closure	Opto 9 Return	Not used
19	f	DC Power	12-24 VDC +	
20	g	DC Power	12-24 VDC -	
21	h	AC Power	115 VAC +	Not used
22	j	AC Power	115 VAC -	Not used
23	V	RS-232 p2	Tx	
24	T	RS-232 p3	Rx	
25	U,W	RS-232 p5	Signal Ground	
26	b	Auxiliary	+5 VDC Out	Not used
27	c	Auxiliary	+5 VDC Out Return	Not used
28-32				Spares

The Contractor shall wire the MVDS cable harness to the terminal blocks in the existing cabinets as shown on the plans. The ends of all unused and spare conductors shall be taped to prevent accidental contact to other circuits.

All software for testing and set-up procedures shall be supplied with the MVDS unit. The software shall test the MVDS unit performance and provide diagnostic information.

Operational Requirements.--The Contractor shall provide a certification from the manufacturer that the MVDS unit will interface and operate with a Model 170 controller. In addition, the MVDS unit shall meet the following requirements:

Electrical.—The unit shall operate with 12-24 VDC at 0.5 A power source. The unit shall have a feature of automatic recovery after a power failure.

Physical.—The unit shall be encased in a weatherproof NEMA 3R enclosure. The unit shall not exceed 6 1/4" x 9 1/2" x 10" in size and shall not weigh more than 10 pounds. The unit shall operate over a temperature range from -35° F to 165° F, up to 95 percent relative humidity.

Installation and Testing.—Prior to installing any MVDS units, the Contractor shall perform functional tests to verify that all MVDS units to be installed work in accordance with these specifications. The MVDS units shall be installed as shown on the plans and in accordance with the manufacturer's recommended installation procedures. The Contractor shall confirm equipment placement with the Engineer before installing any equipment.

The Contractor shall test the MVDS units for the following functions:

1. Presence and passage at all ramp and connector metering locations.
2. Speed, volume and occupancy for all mainline monitoring locations.
3. Correct speed and count readings of mainline traffic with portable detection equipment.

The Contractor shall ensure that the MVDS unit will not cause harmful interference to radio communication. If the operation of the MVDS in a residential area causes harmful interference, the Contractor shall correct the interference at the Contractor's expense.

10-3.27 LUMINAIRES

Section 86-6.01, "High Pressure Sodium Luminaires," of the Standard Specifications is amended by adding the following to the sixth paragraph:

- C. a vertical plane at a minimum peak acceleration level of 1.0 g peak-to-peak sinusoidal loading (same as 0.5 g peak) with the internal ballast installed, for a minimum of 2 million cycles without failure of any luminaire parts.

Ballasts shall be the lag regulator type.

10-3.28 SOFFIT AND WALL LUMINAIRES

No. 7 pull boxes adjacent to soffit luminaires will be required only at the locations shown on the plans.

10-3.29 INTERNALLY ILLUMINATED "METER ON" SIGNS

The "METER ON" sign shall be a Type A pedestrian signal modified such that the reflector shall be a single chamber with 2 incandescent lamps.

Lenses shall be 3/16 inch, minimum thickness, clear acrylic or polycarbonate plastic, or 1/8 inch nominal thickness glass fiber reinforced plastic, with molded, one piece, neoprene gasket. Message lettering for "METER" shall be "Series C", 4 1/2 inches high, with uniform 1/2 inch stroke, and for "ON" shall be "Series C", 6 inches high, with uniform one inch stroke. Letters shall be clear, transparent or translucent, with black opaque background silk screened on to the second surface of the lens.

10-3.30 PHOTOELECTRIC CONTROLS

Contactors shall be the mechanical armature type.

Photoelectric units for illuminated signs shall have a "turn-on" level of between 20 and 30 footcandles. (Turn-on level specified above corresponds to a switching level of approximately 40 to 60 footcandles measured in the horizontal plane.). "Turn-off" level shall not exceed 3 times "turn-on" level.

10-3.31 RELOCATE CHANGEABLE MESSAGE SIGN SYSTEM

Relocate Model 500 changeable message sign (CMS) systems Number 67 shall consist of relocating Model 500 changeable message sign and Model 170 controller assembly in a completely wired Type 1 cabinet, the required wiring and auxiliary equipment required to control the CMS, as shown on the plans and as specified in conformance with these special provisions.

Wiring harnesses for relocated Model 500 changeable message signs will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

Relocate Model 500 changeable message sign system components will conform to the requirements in "Specifications for Changeable Message Sign System," issued by the State of California, Department of Transportation, and to the addendums thereto current at the time of project advertising. Relocated Model 170 controller assemblies will conform to the requirements in "Traffic Signal Control Equipment Specifications," issued by the State of California, Department of Transportation, and to the addendums thereto current at the time of project advertising.

Attention is directed to "Sign Structures" of these special provisions.

The Contractor shall relocate the Model 500 CMS sign assembly on the sign structure, shall construct each relocated controller cabinet foundation as shown on the plans for Model 334 cabinets, shall install the controller cabinet on the foundation, and shall make the field wiring connections to the terminal blocks in the sign assembly and in the controller cabinet as shown on the plans and in conformance with these special provisions.

Field conductors No. 12 and smaller shall terminate with spade terminals. Field conductors No. 10 and larger shall terminate in spade or ring terminals.

A listing of field conductor terminations, will be furnished free of charge to the Contractor at the site of the work.

The location of the foundation for each controller cabinet will be determined by the Engineer.

State forces will maintain the sign assemblies. The Contractor's responsibility shall be limited to conformance with the provisions in Section 6-1.02, "State-Furnished Materials," of the Standard Specifications.

CMS sign structures are provided for elsewhere in these special provisions.

10-3.32 FIBER OPTIC CABLE PLANT

DESCRIPTION

The following fiber optic cable plant specifications are the same as from those used on the contract for the existing system. The Contractor shall install new fiber optic and twisted pair cables, meeting these specifications, as part of the communication system, as shown on the plans. The existing system is described in these special provisions to assist the Contractor in understanding the scope of work involved. Except for verification and testing of the condition of the existing system before and after the new system, the scope of the Contractor's work shall be shown on the plans between Baldwin Avenue and San Gabriel Valley (SGV) Communication Hub Building at Route 605 / Route 10 Separation..

Fiber optic cable shall conform to the details shown on the plans and these special provisions.

DEFINITIONS

The following definitions shall apply to these special provisions:

- A. Active Component Link Loss Budget.—The active component link loss budget is the difference between the average transmitter launch power (in dBm) and the receiver maximum sensitivity (in dBm).
- B. Backbone.—Fiber cable that provides connections between the Transportation Management Center (TMC and hubs, as well as between equipment rooms or buildings, and between hubs. The term is used interchangeably with "trunk" cable.
- C. Connector.—A mechanical device used to align and join two fibers together to provide a means for attaching to and decoupling from a transmitter, receiver, or another fiber (patch panel).
- D. Connectorized.—The termination point of a fiber after connectors have been affixed.
- E. Connector Module Housing (CMH) .—A patch panel used to terminate singlemode fibers with most common connector types. It may include a jumper storage shelf and a hinged door.
- F. Couplers.—Devices which mate fiber optic connectors to facilitate the transition of optical light signals from one connector into another. They are normally located within FDUs, mounted in panels. They may also be used unmounted, to join two simplex fiber runs.
- G. Distribution Cable.—Fiber cable that provides connections between hubs. Drop cables are typically spliced into a distribution cable.
- H. Drop Cable.—Fiber cable that provides connections between a distribution cable to a field element. Typically these run from a splice vault to a splice tray within a field cabinet. Drop cables are usually short in length (less than 65 ft) and are of the same construction as outside plant cable. The term "breakout cable" is used interchangeably with drop cable.
- I. End-to-End Loss.—The maximum permissible end-to-end system attenuation is the total loss in a given link. This loss could be the actual measured loss, or calculated using typical (or specified) values. A designer should use typical values to calculate the end-to-end loss for a proposed link. This number will determine the amount of optical power (in dB) needed to meet the System Performance Margin.
- J. Fan Out Termination.—Permits the branching of fibers contained in an optical cable into individual cables and can be done at field locations; thus, allowing the cables to be connectorized or terminated per system requirements. A kit provides pull-out protection for individual bare fibers to support termination. It provides three layers of protection consisting of a Teflon inner tube, a dielectric strength member, and an outer protective PVC jacket. Fan out terminations shall not be used for more than 6 fibers. Using a patch panel would be appropriate.
- K. Fiber Distribution Frame (FDF) .—A rack mounted system that is usually installed in hubs or the Transportation Management Center (TMC), that may consist of a standard equipment rack, fiber routing guides, horizontal jumper troughs and Fiber Distribution Units (FDU). The FDF serves as the termination and interconnection of passive fiber optic components from cable breakout, for connection by jumpers, to the equipment.
- L. Fiber Distribution Unit (FDU) .—An enclosure or rack mountable unit containing both a patch panel with couplers and splice tray(s). The unit's patch panel and splice trays may be integrated or separated by a partition.
- M. F/O.—Fiber optic.
- N. FOIP.—Fiber optic inside plant cable.
- O. FOOP.—Fiber optic outside plant cable.
- P. FOTP.—Fiber optic test procedure(s) as defined by TIA/EIA standards.
- Q. Jumper.—A short cable, typically 3.5 ft or less, with connectors on each end, used to join two CMH couplers or a CMH to active electronic components.
- R. Light Source.—Portable fiber optic test equipment that, when coupled with a power meter, is used to perform end-to-end attenuation testing. It contains a stabilized light source operating at the wavelength of the system under test.

- S. Link.—A passive section of the system, the ends of which are connectorized. A link may include splices and couplers. For example, a video link may be from a F/O transmitter to a video multiplexer (MUX).
- T. Loose Tube Cable.—Type of cable construction in which fibers are placed in buffer tubes to isolate them from outside forces (stress). A flooding compound or material is applied to the interstitial cable core to prevent water migration and penetration. This type of cable is primarily for outdoor applications.
- U. Mid-span Access Method.—Description of a procedure in which fibers from a single buffer tube are accessed and spliced to an adjoining cable without cutting the unused fibers in the buffer tube, or disturbing the remaining buffer tubes in the cable.
- V. MMFO.—Multimode Fiber Optic Cable.
- W. Optical Time Domain Reflectometer (OTDR) .—Fiber optic test equipment similar in appearance to an oscilloscope that is used to measure the total amount of power loss in a F/O cable between two points. It provides a visual and printed display of the losses associated with system components such as fiber, splices and connectors.
- X. Optical Attenuator.—An optical element that reduces the intensity of a signal passing through it.
- Y. Patchcord.—A term used interchangeably with "jumper".
- Z. Patch Panel.—A precision drilled metal frame containing couplers used to mate two fiber optic connectors.
- AA. Pigtail.—A short optical fiber permanently attached to a source, detector, or other fiber optic device.
- AB. Power Meter.—Portable fiber optic test equipment that, when coupled with a light source, is used to perform end-to-end attenuation testing. It contains a detector that is sensitive to light at the designed wavelength of the system under test. Its display indicates the amount of optical power being received at the end of the link.
- AC. Riser Cable.—NEC approved cable installed in a riser (a vertical shaft in a building connecting floors).
- AD. Segment.—A section of F/O cable that is not connected to any active device and may or may not have splices per the design.
- AE. SMFO.—Singlemode Fiber Optic Cable.
- AF. Splice.—The permanent joining of two fiber ends using a fusion splicer.
- AG. Splice Closure.—A environmentally sealed container used to organize and protect splice trays. The container allows splitting or routing of fiber cables from multiple locations. Normally installed in a splice vault.
- AH. Splice Module Housing (SMH) .—A unit that stores splice trays as well as pigtails and short cable lengths. The unit allows splitting or routing of fiber cables to or from multiple locations.
- AI. Splice Tray.—A container used to organize and protect spliced fibers.
- AJ. Splice Vault.—An underground container used to house excess cable and/or splice closures.
- AK. System Performance Margin.—A calculation of the overall "End to End" permissible attenuation from the fiber optic transmitter (source) to the fiber optic receiver (detector). The system performance margin should be at least 6 dB. This includes the difference between the active component link loss budget, the passive cable attenuation (total fiber loss) and the total connector/splice loss.
- AL. Tight Buffered, Non-Breakout Cable (Tight Buffer Cable).—Type of cable construction where each glass fiber is tightly buffered (directly coated) with a protective thermoplastic coating to 900 µm (compared to 250 µm for loose tube fibers).

FIBER OPTIC OUTSIDE PLANT CABLE

General

Each fiber optic outside plant cable (FOOP) for this project shall be all dielectric, non gel filled or water-blocking material, duct type, with loose buffer tubes and shall conform to these special provisions. Cables with singlemode fibers shall contain 12 and 36 singlemode (SM) dual-window (1310 nm and 1550 nm) fibers. The optical fibers shall be contained within loose buffer tubes. The loose buffer tubes shall be stranded around an all dielectric central member. Aramid yarn and/or fiberglass shall be used as a primary strength member, and a polyethylene outside jacket shall provide for overall protection.

All fiber optic (F/O) cable on this project shall be from the same manufacturer, who is regularly engaged in the production of this material.

The cable shall be qualified as compliant with RUS Federal Rule 7CFR1755.900.

CABLE TYPE	DESCRIPTION
E	12SMFO
G	36SMFO

Fiber Characteristics

Each optical fiber shall be glass and consist of a doped silica core surrounded by concentric silica cladding. All fibers in the buffer tube shall be usable fibers, and shall be sufficiently free of surface imperfections and occlusions to meet the optical, mechanical, and environmental requirements of these specifications. The required fiber grade shall reflect the maximum individual fiber attenuation, to guarantee the required performance of each and every fiber in the cable.

The coating shall be a dual layered, UV cured acrylate. The coating shall be mechanically or chemically strippable without damaging the fiber.

The cable shall comply with the optical and mechanical requirements over an operating temperature range of -40° F to +158° F. The cable shall be tested in accordance with EIA-455-3A (FOTP-3), "Procedure to Measure Temperature Cycling Effects on Optical Fiber, Optical Cable, and Other Passive Fiber Optic Components." The change in attenuation at extreme operational temperatures (-40° F to +158° F) for singlemode fiber shall not be greater than 0.20 dB/km, with 80 percent of the measured values no greater than 0.10 dB/km. The singlemode fiber measurement is made at 1550 nm.

Singlemode fibers within the finished cable shall meet the requirements in the following table:

Fiber Characteristics Table	
Parameters	Singlemode
Type	Step Index
Core diameter	8.3 µm (nominal)
Cladding diameter	125 µm ±1.0 µm
Core to Cladding Offset	0.8 µm
Coating Diameter	250 µm ±15 µm
Cladding Non-circularity defined as: [1-(min. cladding dia ÷ max. cladding dia.)] x 100	1.0%
Proof/Tensile Test	50kpsi (345 Mpa), min.
Attenuation: (-40(C to +70(C) @ 1310 nm @ 1550 nm	0.4 dB/km 0.3 dB/km
Attenuation at the Water Peak	2.1 dB/km @ 1383 ±3 nm
Chromatic Dispersion: Zero Dispersion Wavelength Zero Dispersion Slope	1301.5 to 1321.5 nm 0.092 ps/(nm ² *km)
Maximum Dispersion:	3.3 ps/(nm*km) for 1285 – 1330 nm <18 ps/(nm*km) for 1550 nm
Cut-Off Wavelength	<1260-1250 nm
Mode Field Diameter (Petermann II)	9.3 ±0.5 µm at 1300 1310 nm 10.5 ±1.0 µm at 1550 nm

Color Coding

In buffer tubes containing multiple fibers, each fiber shall be distinguishable from others in the same tube by means of color coding according to the following:

- | | | |
|----------------|---------------|-----------------|
| 1. Blue (BL) | 5. Slate (SL) | 9. Yellow (YL) |
| 2. Orange (OR) | 6. White (WT) | 10. Violet (VL) |
| 3. Green (GR) | 7. Red (RD) | 11. Rose (RS) |
| 4. Brown (BR) | 8. Black (BK) | 12. Aqua (AQ) |

Buffer tubes containing fibers shall also be color coded with distinct and recognizable colors according to the same table listed above for fibers.

These colors shall be targeted in accordance with the Munsell color shades and shall meet EIA/TIA-598 "Color Coding of Fiber Optic Cables."

The color formulation shall be compatible with the fiber coating and the buffer tube filling compound, and be heat stable. It shall not fade or smear or be susceptible to migration and it shall not affect the transmission characteristics of the optical fibers and shall not cause fibers to stick together.

Cable Construction

A. General: The fiber optic cable shall consist of, but not be limited to, the following components:

1. Buffer tubes
2. Central member
3. Filler rods
4. Stranding
5. Core and cable flooding
6. Tensile strength member
7. Ripcord
8. Outer jacket

B. Buffer Tubes

Clearance shall be provided in the loose buffer tubes between the fibers and the inside of the tube to allow for expansion without constraining the fiber. The fibers shall be loose or suspended within the tubes. The fibers shall not adhere to the inside of the buffer tube. Each buffer tube shall contain a maximum of 12 fibers.

The loose buffer tubes shall be extruded from a material having a coefficient of friction sufficiently low to allow free movement of the fibers. The material shall be tough and abrasion resistant to provide mechanical and environmental protection of the fibers, yet designed to permit safe intentional "scoring" and breakout, without damaging or degrading the internal fibers.

Buffer tube filling compound shall be a homogeneous hydrocarbon-based gel with anti-oxidant additives and used to prevent water intrusion and migration. The filling compound shall be non-toxic and dermatologically safe to exposed skin. It shall be chemically and mechanically compatible with all cable components, non-nutritive to fungus, non-hygroscopic and electrically non-conductive. The filling compound shall be free from dirt and foreign matter and shall be readily removable with conventional nontoxic solvents.

Buffer tubes shall be stranded around a central member by a method, such as the reverse oscillation stranding process, that will prevent stress on the fibers when the cable jacket is placed under strain.

C. Central Member

The central member which functions as an anti-buckling element shall be a glass reinforced plastic rod with similar expansion and contraction characteristics as the optical fibers and buffer tubes. To ensure the proper spacing between buffer tubes during stranding, a symmetrical linear overcoat of polyethylene may be applied to the central member to achieve the optimum diameter.

D. Filler Rods

Fillers may be included in the cable to maintain the symmetry of the cable cross-section. Filler rods shall be solid medium or high density polyethylene. The diameter of filler rods shall be the same as the outer diameter of the buffer tubes.

E. Stranding

Completed buffer tubes shall be stranded around the overcoated central member using stranding methods, lay lengths and positioning such that the cable shall meet mechanical, environmental and performance specifications. A polyester binding shall be applied over the stranded buffer tubes to hold them in place. Binders shall be applied with sufficient tension to secure the buffer tubes to the central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking (or rendered so by the flooding compound), and dielectric with low shrinkage.

F. Core and Cable Flooding

The cable core interstices shall contain a water blocking material, to prevent water ingress and migration. The water blocking material shall be either a polyolefin based compound which fills the cable core interstices, or an absorbent polymer, which fills voids and swells to block the ingress of water. The flooding compound or material shall be homogeneous, non-hygroscopic, electrically non-conductive, and non-nutritive to fungus. The compound or material shall also be nontoxic, dermatologically safe and compatible with all other cable components.

G. Tensile Strength Member

Tensile strength shall be provided by high tensile strength aramid yarns and/or fiberglass which shall be helically stranded evenly around the cable core and shall not adhere to other cable components.

H. Ripcord

The cable shall contain at least one ripcord under the jacket for easy sheath removal.

I. Outer Jacket

The jacket shall be free of holes, splits, and blisters and shall be medium or high density polyethylene (PE), or medium density cross-linked polyethylene with minimum nominal jacket thickness of 37 mils. Jacketing material shall be applied directly over the tensile strength members and water blocking material and shall not adhere to the aramid strength material. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus.

The jacket or sheath shall be marked with the manufacturer's name, the words "Optical Cable", the number of fibers, "SM", year of manufacture, and sequential measurement markings every foot. The actual length of the cable shall be within -0/+1 percent of the length marking. The marking shall be in a contrasting color to the cable jacket. The height of the marking shall be 98 mils.

General Cable Performance Specifications

The F/O cable shall withstand water penetration when tested with a 3 foot static head or equivalent continuous pressure applied at one end of a 3 foot length of filled cable for one hour. No water shall leak through the open cable end. Testing shall be done in accordance with EIA-455-82 (FOTP-82), "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable."

A representative sample of cable shall be tested in accordance with EIA/TIA-455-81 (FOTP-81), "Compound Flow (Drip) Test for Filled Fiber Optic Cable". No preconditioning period shall be conducted. The cable shall exhibit no flow (drip or leak) at 70 to 80°C as defined in the test method.

Crush resistance of the finished F/O cables shall be 220 N/mm applied uniformly over the length of the cable without showing evidence of cracking or splitting when tested in accordance with EIA-455-41 (FOTP-41), "Compressive Loading Resistance of Fiber Optic Cables". The average increase in attenuation for the fibers shall be 0.10 dB at 1550 nm (singlemode) for a cable subjected to this load. The cable shall not exhibit any measurable increase in attenuation after removal of load. Testing shall be in accordance with EIA-455-41 (FOTP-41), except that the load shall be applied at the rate of 3 mm to 20 mm per minute and maintained for 10 minutes.

The cable shall withstand 25 cycles of mechanical flexing at a rate of 30 ±1 cycles/minute. The average increase in attenuation for the fibers shall be 0.20 dB at 1550 nm (singlemode) at the completion of the test. Outer cable jacket cracking or splitting observed under 10x magnification shall constitute failure. The test shall be conducted in accordance with EIA-455-104 (FOTP-104), "Fiber Optic Cable Cyclic Flexing Test," with the sheave diameter a maximum of 20 times the outside diameter of the cable. The cable shall be tested in accordance with Test Conditions I and II of (FOTP-104).

The cable shall withstand 20 impact cycles, with a total impact energy of 5.9 N•m. Impact testing shall be conducted in accordance with TIA/EIA-455-25B (FOTP-25) "Impact Testing of Fiber Optic Cables and Cable Assemblies." The average increase in attenuation for the fibers shall be <0.20 dB at 1550 nm for singlemode fiber. The cable shall not exhibit evidence of cracking or splitting.

The finished cable shall withstand a tensile load of 2700 N without exhibiting an average increase in attenuation of greater than 0.20 dB (singlemode). The test shall be conducted in accordance with EIA-455-33 (FOTP-33), "Fiber Optic Cable Tensile Loading and Bending Test." The load shall be applied for one-half hour in Test Condition II of the EIA-455-33 (FOTP-33) procedure.

Packaging and Shipping Requirements

Documentation of compliance to the required specifications shall be provided to the Engineer prior to ordering the material.

Attention is directed to "Fiber Optic Testing," elsewhere in these special provisions.

The completed cable shall be packaged for shipment on reels. The cable shall be wrapped in a weather and temperature resistant covering. Both ends of the cable shall be sealed to prevent the ingress of moisture.

Each end of the cable shall be securely fastened to the reel to prevent the cable from coming loose during transit. Four m of cable length on each end of the cable shall be accessible for testing.

Each cable reel shall have a durable weatherproof label or tag showing the manufacturer's name, the cable type, the actual length of cable on the reel, the Contractor's name, the contract number, and the reel number. A shipping record shall also be included in a weatherproof envelope showing the above information and also include the date of manufacture, cable characteristics (size, attenuation, bandwidth, etc.), factory test results, cable identification number and any other pertinent information.

The minimum hub diameter of the reel shall be at least thirty times the diameter of the cable. The F/O cable shall be in one continuous length per reel with no factory splices in the fiber. Each reel shall be marked to indicate the direction the reel should be rolled to prevent loosening of the cable.

Installation procedures and technical support information shall be furnished at the time of delivery.

LABELING

General

The Contractor shall label all fiber optic cabling in a permanent consistent manner. All tags shall be of a material designed for long term permanent labeling of fiber optic cables and shall be marked with permanent ink on non-metal types, or embossed lettering on metal tags. Metal tags shall be constructed of stainless steel. Non-metal label materials shall be approved by the Engineer. Labels shall be affixed to the cable per the manufacturer's recommendations and shall not be affixed in a manner which will cause damage to the fiber. Handwritten labels shall not be allowed.

Label Identification

1. Labeling of Cables

Labeling of the backbone, distribution and drop fiber optic cables shall conform to the following unique identification code elements:

UNIQUE IDENTIFICATION CODE ELEMENTS for Backbone, Distribution or Drop Cables		
DESCRIPTION	CODE	NUMBER OF CHARACTERS
District	District number	2
Cable Type	Fiber: S: Singlemode M: Multimode Copper: T: 18 AWG, U: 19 AWG, V: 20AWG, W: 22AWG X: 24 AWG	1
Cable fiber (or copper pairs) Count	Number of fibers or conductor pairs (Examples: 144 fibers; or 100 TWP)	3
Route Number	Hwy. Rte (Example: 005)	3
Begin Function	T: TMC; H: HUB; V: Video Node; D: Data Node; C: Cable Node; M: CCTV Camera; N: CMS; P: Traffic Signal; Z: Ramp Meter; U: Traffic Monitoring/Count Station/Vehicle Count Station (VDS, TOS); S: Splice Vault	1
Begin Function Number	Unique ID number corresponds to Begin Function (Example: H02 [Hub 02])	2
End Function	T: TMC; H: HUB; V: Video Node; D: Data Node; C: Cable Node; M: CCTV Camera; N: CMS; P: Traffic Signal; Z: Ramp Meter; U: Traffic Monitoring/Count Station; S: Splice Vault	1
End Function Number	Unique ID number corresponds to Begin Function (Example: H03 [Hub 03])	2
Unique Identifier	XX: If two or more cables of the same count are in the same run	2
TOTAL		17

Each cable shall display one unique identification, regardless of where the cable is viewed. The begin function and end function correspond to the end points of each cable. The order of the begin and end function follow a hierarchy as listed below, where the lowest number corresponding to the begin/end function is listed first.

List of Hierarchy										
1	2	3	4	5	6	7	8	9	10	11
TMC	HUB	Video Node (VN)	Data Node (DN)	Cable Node	CCTV Camera	CMS	Traffic Signal	Ramp Meter	Traffic Monitoring/ Count Station	Splice Vault

This scheme will work as follows: A cable between the TMC and a HUB will always have the TMC listed as the start function and the HUB as the end function. Between a CMS and a Splice Vault, the start function will always be listed as the CMS, and so on. If a cable is connected between HUBs, for example HUB-01 and HUB-03, the lowest number, in this case HUB-01, will be listed as the start function and HUB-03 as the end function.

A. Example 1: 08S060010H02H0302

This cable is located in District 8, identified as a singlemode fiber optic cable containing 60 fibers, installed along highway Route 10, beginning in Hub 2, and ending in Hub 3, with unique ID of number 2. The implication for the unique ID is that there may be another 60 fiber optic cable between those hubs. This is an example for a backbone cable.

B. Example 2: 11S048008H01S04

This cable is located in District 11, identified as a singlemode fiber optic cable containing 48 fibers, installed along highway Route 8, beginning in Hub 1, and ending in Splice Vault 04. In this case, no additional digits are necessary for a unique ID. This is an example for a distribution cable.

C. Example 3: 11S006163N03S04

This cable is located in District 11, identified as a singlemode fiber optic cable containing 6 fibers, installed along highway Route 163, beginning at CMS-03, and ending in Splice Vault 04. In this case, no additional digits are necessary for a unique ID. This is an example for a drop cable.

2. Labeling of Jumpers and Pigtails

Labeling of the jumpers and pigtails shall conform to the following unique identification code elements:

UNIQUE IDENTIFICATION CODE ELEMENTS for JUMPERS (active component to FDU) and PIGTAILS (to connector # on patch panel)		
DESCRIPTION	CODE	NUMBER OF CHARACTERS
Hub Identifier	Hub, TMC, VN or DN ID Numbers or Alphanumeric or both	2
From (Source) Device	MU: Multiplexer FD: FDU (Fiber Distribution Unit) RP: Repeater	2
From (Source) Device Identifier	Numbers or Alphanumeric or both	2
Transmitter or Receiver	T or R	1
To (Destination) Device	MU: Multiplexer FD: FDU (Fiber Distribution Unit) RP: Repeater	2
To (Destination) Device Identifier	Numbers or Alphanumeric or both	2
Connector Identifier	Connector ID	2
TOTAL		13

A. Example 1: 01MU01TFD0203.

This pigtail is located in Hub 1, from multiplexer 01, transmitting to FDU 02 to patch panel position (connector) 03.

B. Example 2: 02MUA1TFD0B08.

This jumper is located in Hub 2, from multiplexer A1, transmitting to FDU B, to patch panel position (connector) 08.

Label Placement

1. Cables

All cables shall be clearly labeled with the unique identification code element method described elsewhere in these special provisions, at all terminations, even if no connections or splices are made, and at all splice vault entrance and exit points.

2. Cable to Cable Splices

All cable jackets entering the splice closure shall be labeled in accordance with the identification method described elsewhere in these special provisions.

3. Cable to Fiber Distribution Units

The cable jackets shall be clearly labeled at entry to the FDU in accordance with the unique identification code element method described elsewhere in these special provisions. In addition, each fiber shall be labeled with the Fiber ID and pigtails shall be labeled at the connector with the Fiber ID. The FDU shall be clearly labeled with the Cable ID on the face of the FDU. If multiple cables are connected to the FDU, each block of connectors relating to each individual cable shall be clearly identified by a single label with the Cable ID. Individual connections shall be clearly marked on the face of the FDU in the designated area with the Fiber ID.

4. Fiber

Fibers labels shall be placed next to the connectors of the individual fibers.

5. Patch Panels

The cable jackets shall be clearly labeled at entry to the Patch Panel in accordance with the unique identification code element method described elsewhere in these special provisions. In addition, each fiber shall be labeled with the Fiber ID and pigtails shall be labeled at the connector with the Fiber ID. The Patch panel shall be clearly labeled with the Cable ID on the face of the Panel. If multiple cables are connected to the Patch Panel, each block of connectors relating to each individual cable shall be clearly identified by a single label with the Cable ID. Individual connections shall be clearly marked on the face of the Panel in the designated area with the Fiber ID.

6. Jumpers

Equipment to FDU jumpers shall be labeled as to the equipment type connected and shall be labeled at both ends. FDU to FDU jumpers shall be labeled at each end in accordance with the unique identification code element method described elsewhere in these special provisions.

7. Pigtails

Pigtails shall be labeled at the connector in accordance with the unique identification code element method described elsewhere in these special provisions.

8. Copper Cable Labels

All twisted-pair communication cables shall be clearly labeled in a in accordance with the unique identification code element method described elsewhere in these special provisions.

CABLE INSTALLATION

Installation procedures shall be in conformance with the procedures specified by the cable manufacturer for the specific cable being installed. The contractor shall submit the manufacturer's recommended procedures for pulling fiber optic cable at least 20 working days prior to installing cable. Mechanical aids may be used provided that a tension measuring device, and a break away swivel are placed in tension to the end of the cable. The tension in the cable shall not exceed 2225 N or the manufacturer's recommended pulling tension, whichever is less.

During cable installation, the bend radius shall be maintained at a minimum of twenty times the outside diameter. The cable grips for installing the fiber optic cable shall have a ball bearing swivel to prevent the cable from twisting during installation.

F/O cable shall be installed using a cable pulling lubricant recommended by the F/O cable and/or the innerduct manufacturer, and a pull tape conforming to the provisions described under "conduit" elsewhere in these special provisions. Contractor's personnel shall be stationed at each splice vault and pullbox through which the cable is to be pulled to lubricate and prevent kinking or other damage.

F/O cable shall be installed without splices except where specifically allowed on the plans. If splice locations are not shown on the plans, splicing shall be limited to one cable splice every 6 km. Any midspan access splice or FDU termination shall involve only those fibers being spliced as shown on the plans. Cable splices shall be located in splice closures, installed in splice vaults shown on the plans. A minimum of 65 ft of slack shall be provided for each F/O cable at each splice vault. Slack shall be divided equally on each side of the F/O splice closure.

Unless shown or provided otherwise, only F/O cable shall be installed in each innerduct. Pulling a separate F/O cable into a spare duct to replace damaged fiber will not be allowed.

At the Contractor's option, the fiber may be installed using the air blown method. If integral innerduct is used, the duct splice points or any temporary splices of innerduct used for installation must withstand a static air pressure of 110 psi.

The fiber installation equipment must incorporate a mechanical drive unit or pusher, which feeds cable into the pressurized innerduct to provide a sufficient push force on the cable, which is coupled with the drag force created by the high-speed airflow. The unit must be equipped with controls to regulate the flow rate of compressed air entering the duct and any hydraulic or pneumatic pressure applied to the cable. It must accommodate longitudinally ribbed, or smooth wall ducts from nominal 5/8 inch to 2 inch inner diameter. Mid assist or cascading of equipment must be for the installation of long cable runs. The equipment must incorporate safety shutoff valves to disable the system in the event of sudden changes in pneumatic or hydraulic pressure.

The equipment must not require the use of a piston or any other air capturing device to impose a pulling force at the front end of the cable, which also significantly restricts the free flow of air through the inner duct. It must incorporate the use of a counting device to determine the speed of the cable during installation and the length of the cable installed.

SPLICING

Field splices shall be done either in splice vaults or cabinets as shown on the plans. All splices in splice vaults shall be done in splice trays, housed in splice closures. All splices in cabinets shall be done in splice trays housed in FDU's.

Unless otherwise specified, fiber splices shall be the fusion type. The mean splice loss shall not exceed 0.07 dB per splice. The mean splice loss shall be obtained by measuring the loss through the splice in both directions and then averaging the resultant values.

All splices shall be protected with a metal reinforced thermal shrink sleeve.

The mid-span access method shall be used to access the individual fibers in a cable for splicing to another cable as shown on the plans. Cable manufacturers recommended procedures and approved tools shall be used when performing a mid-span access. Only the fibers to be spliced may be cut. All measures shall be taken to avoid damaging buffer tubes and individual fibers not being used in the mid-span access.

The individual fibers shall be looped one full turn within the splice tray to avoid micro bending. A 1 3/4 inches minimum bend radius shall be maintained during installation and after final assembly in the optical fiber splice tray. Each bare fiber shall be individually restrained in a splice tray. The optical fibers in buffer tubes and the placement of the bare optical fibers in the splice tray shall be such that there is no discernable tensile force on the optical fiber.

The Contractor will be allowed to splice a total of 30 percent of all fibers to repair any damage done during mid-span access splicing without penalty. The Contractor will be assessed a fine of \$300.00 for each additional and unplanned splice. Any single fiber may not have more than 3 unplanned splices. If any fiber requires more than 3 unplanned splices, the entire length of F/O cable must be replaced at the Contractor's expense.

SPLICE CLOSURES

The F/O field splices shall be enclosed in splice closures which shall be complete with splice organizer trays, brackets, clips, cable ties, seals and sealant, as needed. The splice closure shall be suitable for a direct burial or pull box application. Manufacturer's installation instructions shall be supplied to the Engineer prior to the installation of any splice closures. Location of the splice closures shall be where a splice is required as shown on the plans, designated by the Engineer, or described in these special provisions.

The splice closure shall conform to the following specifications:

- A. Non-filled thermoplastic case
- B. Rodent proof, water proof, re-enterable and moisture proof
- C. Expandable from 2 cables per end to 8 cables per end by using adapter plates
- D. Cable entry ports shall accommodate 10 mm to 25 mm diameter cables
- E. Multiple grounding straps
- F. Accommodate up to 8 splice trays
- G. Suitable for "butt" or "through" cable entry configurations
- H. Place no stress on finished splices within the splice trays

The splice closure shall be bolted to the side wall of the splice vault.

The Contractor shall verify the quality of each splice prior to sealing the splice closure. The splice closure shall not be sealed until link testing is performed and is approved by the Engineer.

SPLICE TRAYS

Splice trays must accommodate a minimum of 12 fusion splices and must allow for a minimum bend radius of 45 mm. Individual fibers must be looped one full turn within the splice tray to allow for future splicing. No stress is to be applied on the fiber when it is located in its final position. Buffer tubes must be secured near the entrance of the splice tray to reduce the chance that an inadvertent tug on the pigtail will damage the fiber. The splice tray cover may be transparent.

Splice trays in the splice closure shall conform to the following:

- A. Accommodate up to 24 fusion splices
- B. Place no stress on completed within the tray
- C. Stackable with a snap-on hinge cover
- D. Buffer tubes securable with channel straps
- E. Must be able to accommodate a fusion splice with the addition of an alternative splice holder
- F. Must be labeled after splicing is completed.

Only one single splice tray may be secured by a bolt through the center of the tray in the fiber termination unit. Multiple trays must be securely held in place as per the manufacturer's recommendation.

PASSIVE CABLE ASSEMBLIES AND COMPONENTS

The F/O cable assemblies and components shall be compatible components, designed for the purpose intended, and manufactured by a company regularly engaged in the production of material for the fiber optic industry. All components or assemblies shall be best quality, non-corroding, with a design life of at least 20 years.

The cable assemblies and components manufacturer shall be ISO9001 registered.

FIBER OPTIC CABLE TERMINATIONS

General

Fiber optic outside plant (FOOP) cable entering a building shall be routed as described in these special provisions and as shown on the plans. The cable shall continue within the conduit to the designated termination point for cable termination. All components shall be the size and type required for the specified fiber. Fiber optic cable terminations may take place in several locations such as TMCs, hubs, data nodes, cable nodes, TOS cabinets, camera sites, etc.

Cable Termination

At the FDU, the cable jacket of the FOIP or outside plant cable, shall be removed exposing the aramid yarn, filler rods, and buffer tubes. The exposed length of the buffer tubes shall be at least the length recommended by the FDU manufacturer which allows the tubes to be secured to the splice trays. Each buffer tube shall be secured to the splice tray in which it is to be spliced. The remainder of the tubes shall be removed to expose sufficient length of the fibers in order to properly install on the splice tray, as described in "Splicing," elsewhere in these special provisions.

The cable shall then be spliced and secured with tie wraps and routed to its appropriate fiber distribution frame/unit (FDF/U) as shown on the plans.

When applicable, moisture blocking gel shall be removed from the exposed buffer tubes and fibers. The transition from the buffer tube to the bundle of jacketed fibers shall be treated by an accepted procedure for sleeve tubing, shrink tube and silicone blocking of the transition to prevent future gel leak. Manufacturer directions shall be followed to ensure that throughout the specified temperature range gel will not flow from the end of the buffer tube. The individual fibers shall be stripped and prepared for splicing.

Factory terminated pigtails shall then be spliced and placed in the splice tray.

All fibers inside a fiber optic cable entering an Fiber Distribution Unit (FDU), such as at a TMC or hub, shall be terminated and labeled. Attention is directed to "Fiber Distribution Unit" elsewhere in these special provisions.

A transition shall then be made, with flexible tubing, to isolate each fiber to protect the individual coated fibers. The final transition from bundle to individual fiber tube shall be secured with an adhesive heat shrink sleeve. Refer to Fan Out Termination, elsewhere in these special provisions.

Distribution Interconnect Package

Distribution involves connecting the fibers to locations shown on the plans. The distribution interconnect package consists of FDFs and FDU's with connector panels, couplers, splice trays, fiber optic pigtails and cable assemblies with connectors. The distribution interconnect package shall be assembled and tested by a company that is regularly engaged in the assembly of these packages. Attention is directed to "Fiber Optic Testing" elsewhere in these special provisions. All distribution components shall be products of the same manufacturers, who are regularly engaged in the production of these components, and the respective manufacturers shall have quality assurance programs.

Fiber Optic Cable Assemblies and Pigtails

1. General

Cable assemblies (jumpers and pigtails) shall be products of the same manufacturer. The cable used for cable assemblies shall be made of fiber meeting the performance requirements of these special provisions for the F/O cable being connected.

2. Pigtails

Pigtails shall be of simplex (one fiber) construction, in 900 μ m tight buffer form, surrounded by aramid for strength, with a PVC jacket with manufacturer identification information, and a nominal outer jacket diameter of 0.118 inch. Singlemode simplex cable jackets shall be yellow in color. All pigtails shall be factory terminated and tested and at least 3.5 ft in length.

3. Jumpers

Jumpers may be of simplex or duplex design. Duplex jumpers shall be of duplex round cable construction, and shall not have zipcord (siamese) construction. All jumpers shall be at least 6.5 ft in length, sufficient to avoid stress and allow orderly routing.

The outer jacket of duplex jumpers shall be colored according to the singlemode color (yellow) specified above. The two inner simplex jackets shall be contrasting colors to provide easy visual identification for polarity.

4. Connectors

Connectors shall be of the ceramic ferrule ST type for SM. Indoor ST connector body housings shall be either nickel plated zinc or glass reinforced polymer construction. Outdoor ST connector body housing shall be glass reinforced polymer.

The associated coupler shall be of the same material as the connector housing.

All F/O connectors shall be the 0.08 in connector ferrule type with Zirconia Ceramic material with a PC (Physical Contact) pre-radiused tip.

The ST connector operating temperature range shall be -40°C to +70°C. Insertion loss shall not exceed 0.4 dB for singlemode, and the return reflection loss on singlemode connectors shall be at least -35 dB. Connection durability shall be less than a 0.2 dB change per 500 mating cycles per EIA-455-21A (FOTP-21). All terminations shall provide a minimum 222 N pull out strength. Factory test results shall be documented and submitted to the Engineer prior to installing any of the connectors. Singlemode connectors shall have a yellow color on the body and/or boot that renders them easily identifiable.

Field terminations shall be limited to splicing of adjoining cable ends and/or cables to ST pigtails.

All connectors shall be factory-installed and tested. There shall be no installation of connectors in the field.

All unmated connectors shall have protective caps installed.

Fan Out Termination

A fan out termination shall be required as shown on the plans designated by the Engineer or described in these special provisions.

For fiber counts of less than 6 fibers, a fan out termination may be used to terminate the incoming fiber optic cable. The connector return loss shall be no greater than -40 dB.

The fan out termination shall consist of a splice connector and the appropriate number of fiber optic pigtails which will be fusion spliced to the incoming fibers.

The pigtail shall be contained in a housing that will provide strain relief between the incoming fiber optic cable plant jacket, buffer tubes, fibers and pigtail jacket material.

Each fiber shall be spliced to a pigtail with a factory installed and polished ST connector, as specified elsewhere in these special provisions. The splices shall then be encapsulated in a weatherproof housing. Each connector shall have a weatherproof cap to protect it from the elements. The pigtail shall be of simplex (one fiber) construction, in a 900 μ m tight buffer form, surrounded by Aramid yarn for strength. The buffer shall have a PVC jacket with manufacturer identification

information, and a nominal outer jacket diameter of 0.118 inch. Singlemode simplex cable jackets shall be yellow in color. All pigtails shall be at least 6.5 ft in length.

Each pigtail shall be labeled, as specified elsewhere in these special provisions, and secured onto the cable using clear heat shrink tubing.

FIBER DISTRIBUTION UNIT

The fiber distribution unit (FDU) shall consist of a EIA 19-inch rack, a compartment for termination and distribution cable tray and a compartment for a splice drawer.

The FDU shall not exceed 10 inches in height and 15 inches in depth.

The Contractor shall furnish and install all components to terminate the incoming fiber optic communication cables:

FDU Type	Accommodates Termination of
B	12 SMFO fibers
E	36 SMFO fibers

The fiber distribution unit shall include a patch panel to terminate the appropriate number of singlemode fibers with ST type connector feed through couplers.

The termination and distribution cable trays shall accommodate 12 and 36 singlemode optical fiber cables. The termination and distribution cable trays shall have sufficient tray areas for excess optical fiber storage with provisions to assure that the optical fibers do not exceed a 2-inch bend radius. The termination and distribution cable trays shall include a designation strip for identification of the 12 and 36 singlemode optical fibers. Each splice drawer shall include two splice trays with each splice tray capable of accommodating 12 and 36 fusion type splices. Each splice drawer shall allow for storage of excess lengths of the optical fibers of fiber optic cables. Each fiber distribution unit shall be provided with cable clA to secure fiber optic cables to the chassis.

Strain relief shall be provided for the incoming fiber optic cable. Cable accesses shall have rubber grommets or similar material to prevent the cable from coming in contact with bear metal. All fibers shall be terminated and individually identified in the FDU and on the patch panel.

The patch panel shall be hinged or have coupler plates to provide easy access and maintenance. Brackets shall be provided to spool the incoming fiber a minimum of two turns, each turn shall not be less than 12 inches, before separating out individual fibers to the splice tray.

Installation.--The Contractor shall install sufficient quantity of fiber distribution units to terminate all fibers in the largest cable as shown in the Plans. The fiber distribution shall be mounted in equipment racks as shown on the plans. At each fiber distribution unit, the Contractor shall terminate the optical fibers of the fiber optic cable. The optical fibers shall be fusion spliced to each of the single mode optical fiber cables assemblies within the splice tray(s).

The optical fibers shall be of appropriate lengths to allow for future splicing with the splice drawer and shall be appropriately identified (tagged). All splices shall be fusion type and shall be arranged within the splice trays of the fiber distribution unit in accordance with the organizational design of the splice trays. Appropriate protective coating shall be applied to all fusion splices.

Payment.--Full compensation for fiber distribution unit shall be considered as included in the contract prices paid for the item requiring fiber distribution unit and no separate payment will be made therefor.

FIBER OPTIC TESTING

General

Testing shall include the tests on elements of the passive fiber optic components: (1) at the factory, (2) after delivery to the project site but prior to installation, (3) after installation but prior to connection to any other portion of the system. The Contractor shall provide all personnel, equipment, instrumentation and materials necessary to perform all testing. The Engineer shall be notified two working days prior to all field tests. The notification shall include the exact location or portion of the system to be tested.

Documentation of all test results shall be provided to the Engineer within 2 working days after the test involved.

A minimum of 15 working days prior to arrival of the cable at the site, the Contractor shall provide detailed test procedures for all field testing for the Engineer's review and approval. The procedures shall include the tests involved and how the tests are to be conducted. Included in the test procedures shall be the model, manufacturer, configuration, calibration and alignment procedures for all proposed test equipment.

Factory Testing

Documentation of compliance with the fiber specifications as listed in the Fiber Characteristics Table shall be supplied by the original equipment manufacturer. Before shipment, but while on the shipping reel, 100 percent of all fibers shall be tested for attenuation. Copies of the results shall be (1) maintained on file by the manufacturer with a file identification number for a minimum of seven years, (2) attached to the cable reel in a waterproof pouch, and (3) submitted to the Contractor and to the Engineer.

Arrival On Site

The cable and reel shall be physically inspected on delivery and 100 percent of the fibers shall be attenuation tested to confirm that the cable meets requirements. The failure of any single fiber in the cable to comply with these special provisions, is cause for rejection of the entire reel. Test results shall be recorded, dated, compared and filed with the copy accompanying the shipping reel in a weather proof envelope. Attenuation deviations from the shipping records of greater than five percent shall be brought to the attention of the Engineer. The cable shall not be installed until completion of this test sequence and the Engineer provides written approval. Copies of traces and test results shall be submitted to the Engineer. If the test results are unsatisfactory, the reel of F/O cable shall be considered unacceptable and all records corresponding to that reel of cable shall be marked accordingly. The unsatisfactory reels of cable shall be replaced with new reels of cable at the Contractor's expense. The new reels of cable shall then be tested to demonstrate acceptability. Copies of the test results shall be submitted to the Engineer.

After Cable Installation

Index matching gel shall not be allowed in connectors during testing. After the fiber optic cable has been pulled but before breakout and termination, 100 percent of all the fibers shall be tested with an OTDR for attenuation. Test results shall be recorded, dated, compared and filed with the previous copies of these tests. Copies of traces and test results shall be submitted to the Engineer. If the OTDR test results are unsatisfactory, the F/O cable segment of cable shall be unacceptable. The unsatisfactory segment of cable shall be replaced with a new segment, without additional splices, at the Contractor's expense. The new segment of cable then shall be tested to demonstrate acceptability. Copies of the test results shall be submitted to the Engineer.

System Cable Verification At Completion

1. Power Meter and Light Source

At the conclusion of the OTDR testing, 100 percent of the fiber links shall be tested end to end with a power meter and light source, in accordance with EIA Optical Test Procedure 171 and in the same wavelengths specified for the OTDR tests. These tests shall be conducted in one direction. As shown in Appendix A, the Insertion Loss (IC) shall be calculated. Test results shall be recorded, compared, and filed with the other recordings of the same links. Test results shall be submitted to the Engineer. These values shall be recorded in the Cable Verification Worksheet in Appendix A.

2. OTDR Testing

Once the passive cabling system has been installed and is ready for activation, 100 percent of the fibers shall be tested with the OTDR for attenuation at wavelengths of both 1310 nm and 1550 nm. OTDR testing shall be performed in both directions (bidirectional), on all fibers. Test results shall be generated from software of the test equipment, recorded, dated, compared and filed with previous copies. A hard copy printout and a electronic copy on a DOS based 3.5-inch diskette of traces and test results shall be submitted to the Engineer. The average of the two losses shall be calculated, and recorded in the Cable Verification Worksheet in Appendix A. The OTDR shall be capable of recording and displaying anomalies of at least 0.02 dB. All connector losses must be displayed on the OTDR traces.

3. Cable Verification Worksheet

The Cable Verification Worksheet shown in Appendix A shall be completed for all links in the fiber optic system, using the data gathered during cable verification. The completed worksheets shall be included as part of the system documentation.

4. Test Failures

If the link loss measured from the power meter and light source exceeds the calculated link loss, or the actual location of the fiber ends does not agree with the expected location of the fiber ends (as would occur with a broken fiber), the fiber optic link will not be accepted. The unsatisfactory segments of cable, or splices shall be replaced with a new segment of cable or splice at the Contractor's expense. The OTDR testing, power meter and light source testing and Cable Verification Worksheet shall be completed for the repaired link to determine acceptability. Copies of the test results shall be submitted to the Engineer. The removal and replacement of a segment of cable shall be interpreted as the removal and replacement of a single contiguous length of cable connecting two splices and two connectors. The removal of a small section containing the failure and therefore introducing new unplanned splices, will not be allowed.

Passive Component Package Testing and Documentation

All components in the passive component package (FDUs, pigtails, jumpers, couplers, and splice trays) shall be from a manufacturer who is ISO9001 registered.

In developing the passive component package, each connector termination (pigtail, or jumper) shall be tested for insertion attenuation loss using an optical power meter and source. In addition, all singlemode terminations shall be tested for return reflection loss. These values shall meet the loss requirements specified earlier and shall be recorded on a tag attached to the pigtail or jumper.

Once an assembly is complete, the manufacturer shall visually verify all tagging of loss values is complete. As a final quality control measure, the manufacturer shall do an "end to end" optical power meter/light source test from pigtail end to end to the terminating point assure continuity and overall attenuation loss valued.

The final test results shall be recorded, along with previous individual component values, on a special form assigned to each FDU. The completed form shall be dated and signed by the Manufacturer's Quality Control supervisor. One copy of this form will be attached in a plastic envelope to the assembled FDU unit. Copies will be provided separately to the Contractor and to the Engineer, and shall also be maintained on file by the manufacturer or supplier.

The assembled and completed FDU unit shall then be protectively packaged for shipment to the Contractor for installation.

Fiber Optic System Performance Margin Design Criteria

The installed system performance margin shall be at least 6 dB for every link. If the design system performance margin is less than 6 dB, the Engineer shall be notified and informed of the Contractor's plan to meet that requirement.

Active Component Testing

The transmitters and receivers shall be tested with a power meter and light source, to record the transmitter average output power (dBm) and receiver sensitivity (dBm). These values shall be recorded in the Fiber System Performance Margin Calculations Worksheet in Appendix B, section C, number 6.

Testing before disconnection of existing cables

The existing fiber optic cable shall be physically inspected prior to disconnection for any works by the Contractor and the attenuation shall be measured for 100 percent of the fibers. Test results shall be recorded, dated, compared and filed with the Engineer in a weather-proof envelope. Attenuation deviations from the existing records of greater than five percent shall be brought to the attention of the Engineer. The existing fiber optic cables shall not be removed until completion of this test sequence and the Engineer provides written approval. Copies of traces and test results shall be submitted to the Engineer. If the test results are unsatisfactory, existing fiber optic cable shall be considered unacceptable, only by the Engineer, and shall be replaced from the two nearest existing splice vaults

A minimum of 15 working days prior to disconnection of existing fiber optic cables for the any works by the Contractor and prior to arrival of the cable at the site, the Contractor shall provide detailed test procedures for all field testing for the Engineer's review and approval. The procedures shall identify the tests to be performed and how the tests are to be conducted. Included in the test procedures shall be the model, manufacturer, configuration, calibration and alignment procedures for all proposed test equipment. Documentation of all test results shall be provided to the Engineer within two working days after the test involved

APPENDIX A

Cable Verification Worksheet

*End-to-End Attenuation (Power Meter and Light Source) Testing
and OTDR Testing*

Contract No. _____ Contractor: _____

Operator: _____ Date: _____

Link Number: _____ Fiber Number: _____

Test Wavelength (Circle one): 1310 nm 1550 nm

Expected Location of fiber ends: End 1: _____ End 2: _____

Power Meter and Light Source Test Results:

Power In:	_____ dBm	1A
Output Power:	_____ dBm	1B
Insertion Loss [1A - 1B]:	_____ dB	1C

OTDR Test Results:

Forward Loss:	_____ dB	2A
Reverse Loss:	_____ dB	2B
Average Loss [(2A + 2B)/2]:	_____ dB	2C

To Be Completed by Caltrans:

Resident Engineer's Signature: _____

Cable Link Accepted: _____

APPENDIX B

Fiber System Performance Margin Calculations Worksheet

A. Calculate the Passive Cable Attenuation

1. Calculate Fiber Loss at Operating Wavelength: _____ nm	Cable Distance (times) Individual Fiber Loss (equal) @ 1310 nm (0.4 dB/km) @ 1550 nm (0.3 dB/km)	_____ km x _____ dB/km =
Total Fiber Loss:		_____ dB

B. Calculate the Total Connector/Splice Loss

2. Calculate Connectors/couplers Loss: (exclude Tx and Rx connectors)	Individual Connector Loss (times) Number of Connector Pairs (equal) Total Connector Loss:	0.4 dB x ____ = _____ dB
3. Calculate Splice Loss:	Individual Splice Loss (times) Number of Splices (equal) Total Splice Loss:	0.1 dB x ____ = _____ dB
4. Calculate Other Components Loss:	Total Components:	_____ dB
5. Calculate Total Losses:	Total Connector Loss (plus) Total Splice Loss (plus) Total Components (equal)	+ dB + dB + dB =
Total Connector/Splice Loss:		_____ dB

C. Calculate Active Component Link Loss Budget

System Wavelength:		_____ nm
Fiber Type:		singlemode
Average Transmitter Output (Launch Power):		_____ dBm
Receiver MAX Sensitivity (10 ⁹ BER) (minus)		_____ dBm
Receiver MIN Sensitivity (equal)		- _____ dBm =
Receiver Dynamic Range:		_____ dB
6. Calculate Active Component Link Loss Budget:	Average Transmitter Output (Launch Power) (minus)	_____ dBm
	Receiver MAX Sensitivity (equal)	- _____ dBm =
Active Component Link Loss Budget:		_____ dB

D. Verify Performance

7. Calculate System Performance Margin to Verify Adequate Power:	Active Component Link Loss Budget [C] (minus) Passive Cable Attenuation [A] (minus) Total Connector/Splice Lost [B] (equal)	_____ dB - _____ dB - _____ dB =
System Performance Margin:		_____ dB

10-3.33 RELOCATE AND MODIFY CLOSED CIRCUIT TELEVISION CAMERA EQUIPMENT

Relocate and modify closed circuit television (CCTV) camera equipment at various locations shall consist of providing electrical service and relocating or modifying existing CCTV system as shown on plans and as directed by the Engineer, to provide a fully functional site at locations as shown on the plans.

The existing CCTV system consists of Type 334-TV cabinet and control equipment, CCTV camera assembly which includes pan and tilt unit, color video camera, camera lens and camera housing, camera control receiver (CCR) and camera control circuits and accessories, CCTV wiring which include enclosed or outdoor cables for video and camera control, connectors and coaxial cables, camera pole, camera junction box, video transmitter and other required equipment and as shown on plans.

The Contractor shall relocate or modify the CCTV equipment as part of the communication system in accordance with manufacturer's specifications, as shown on the plans and as directed by the Engineer, to provide a fully functional site at locations as shown on the plans.

The existing communication system is described in these special provisions to assist the Contractor in understanding the scope of work involved.

Before the relocation or modification of the CCTV cameras, the Contractor shall submit a test plan in accordance with manufacturer's specifications for approval in advance by the Engineer as described elsewhere in these special provisions. The test plan is also to verify that all equipment function before construction and to record the working condition of those equipment. After installation, all CCTV camera location equipment shall be tested at each individual site as described elsewhere in these special provisions.

The Contractor shall arrange to have a technician, qualified to work on the closed circuit television equipment and employed by the closed circuit television equipment manufacturer or his representative, present at the time the equipment is relocated or modified.

Except for verification and testing of the condition of the existing system before and after the new system is installed, the scope of the Contractor's work shall be as shown on the plans between Baldwin Avenue and San Gabriel Valley Communication Hub Building (SGV HUB) at Route 605 / Route 10 Interchange.

Attention is directed to "System Testing and Documentation," elsewhere in these special provisions regarding testing the relocated and modified CCTV camera equipment at various locations.

CLOSED CIRCUIT TELEVISION CAMERA POLE

Camera poles shall conform to the provisions in Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications and these special provisions.

The CCTV camera pole shall be made from sheet steel and the pole shall be hot-dip galvanized after fabrication in accordance with the provisions in Section 75-1.05, "Galvanizing," of the Standard Specifications. The pole shall be fabricated to the dimensions and with all the accessories as shown in the plans.

The horizontal plane of the existing pan and tilt base plate shall be perpendicular to the vertical plane of the CCTV camera pole. The CCTV camera pole shall be erected plumb. The vertical axis of the erected CCTV camera pole shall be within three inches of the theoretical vertical axis when measured without the action of sunlight or wind.

A junction box shall be installed on the camera pole approximately 6 inches from the top of the pole as shown on the plans and described elsewhere in these special provisions.

RELOCATE EXISTING PAN AND TILT UNIT

Pan and Tilt Stops.--The existing pan and tilt unit have both mechanical and electrical pan and tilt stops. The settings of these pan and tilt stops shall be determined by the Engineer.

Relocation.--The Engineer will notify the Contractor of the pan and tilt stops for the existing pan and tilt unit to be relocated for the Contractor to set prior to installation check at the new location. Installation check at the new location shall be done by the Contractor in the presence of the Engineer. The operation of the relocated pan and tilt unit will be performed at the 334-TV cabinet adjacent to the freeway pole(s) where the existing camera is relocated and mounted. The Contractor shall furnish a color video monitor, for testing only, to view the actual camera image. The Engineer shall direct adjustments for pan and tilt presets and pan and tilt stops, to be made by the Contractor. Upon completion of the installation, the Engineer shall verify operation of the pan and tilt unit at the new location.

RELOCATE EXISTING CAMERA CONTROL RECEIVER

The existing camera control receiver (CCR) includes all auxiliary equipment required to interface with the communication subsystem, outdoor pan and tilt units, and the CCTV camera assemblies.

Designed for continuous operation in outdoor weather conditions, the camera control receiver receives commands from the existing camera control transmitter (CCT) in the TMC and decode them into the switch closures, that are used to operate and orient a CCTV camera. In addition, the camera control receiver generates outputs to control ancillary equipment and operations as defined elsewhere in these special provisions. The CCR is connected to the camera control transmitter by cable, providing an analog voice circuit equipped with multipoint modems. These modems may be internal or external to the CCR. The CCR is completely compatible and interchangeable with the Javelin Model JO408R-CCR receiver and is fully compatible with the existing Javelin Model JO1400R camera control transmitter and Javelin Model JO4100DT camera control keypad located in the TMC.

The existing CCR provides the following functions:

Receives and decodes signals from the existing CCT in the TMC and activate pan, tilt, zoom, focus, iris and auxiliary functions at the remote camera site in the camera and pan, tilt and zoom unit. The existing CCR provides both local automatic and remote manual iris adjustment and provides control for automatic or manual shutter speed with the selections made by commands initiated from the existing CCT in the TMC.

Provides the capability to locally store and activate a minimum of 15 camera preset positions. The preset information shall be digitally stored at the CCR. Presets shall be assignable and activated from the existing CCT in the TMC. In the event of a power failure preset settings shall be maintained. The existing CCR or CCT shall be able to recalculate the preset values when the pan and tilt unit is modified or relocated.

Provides the capability of transmitting positioning feedback information from the pan, tilt, and zoom potentiometers to the existing CCT in the TMC using an eight bit, or equivalent, digital format. The positioning feedback information shall only be transmitted when a command requesting positioning feedback is received from the existing CCT in the TMC.

Includes the capability to process and implement a minimum of three auxiliary control signals. For example, auxiliary control signals may provide needed control of heaters, washers and wipers on cameras, etc. At least two of the auxiliary control signals shall be latching. At least three inputs capable of sensing a dry contact closure shall also be provided.

Provides local control functions for pan, tilt, zoom, focus, and other operations. These control functions shall be performed from a portable unit communicating through a serial port on the existing CCR. A switch shall be provided to defeat remote commands from the existing CCT in the TMC and allow the activation of all local control functions.

The Contractor shall test the camera control system for the following functions:

After relocating all equipment at each CCTV site, the Contractor shall confirm the operation of the camera control receiver and modem using test equipment and other necessary equipment that emulates all the functions of the existing CCT in the TMC and modem, and shall document all results.

After relocating all camera control receivers and modems and the communication system, the Contractor shall demonstrate the operation of the camera control system and shall assign all system parameters using test equipment that emulates all the functions of the camera control keypad, camera control transmitter and modem from the TMC and shall keep test equipment in operation until witnessed and approved by the Engineer.

Test equipment that emulates all the functions of the camera control transmitter and modem shall address all existing camera control receivers (CCR) and shall operate all remote control functions, including pan and tilt, zoom, focus, set up, and recall a minimum of ten preset positions per remote CCR address.

RELOCATE EXISTING MODEM

The existing modem provides the interface between the existing CCR and existing CCT over voice grade communication lines in direct connection to a common carrier telephone line and compatible with the existing General DataComm Series 9600RP modem installed at the existing CCT.

The modem has the transmission range over a minimum of 37,000 feet of No. 22 AWG, twisted pair cable, with a bit error rate of better than one in 1×10^5 in an operational environment. The modem provides full duplex communication compliant with CCITT standard modem signaling at 9.6 kbps with fall back to 7.2 kbps and 4.8 kbps over two or four wire dial up lines or leased lines with switch or control command selection.2b.

The modem uses a standard EIA-232-D interface and is configured as data circuit communication equipment (DCE), as defined by that standard. The modem raises Clear to Send On after it detects Request to Send On.

RELOCATE EXISTING CAMERA JUNCTION BOXES

The existing camera junction boxes shall be securely mounted on the camera support structure using stainless steel straps. The mounting hardware or method shall not impede the operation of the door. The connections shall be weather tight grommets. The camera junction box shall be mounted on the side of the pole away from freeway traffic.

RELOCATE EXISTING CLOSED CIRCUIT TELEVISION WIRING

The existing CCTV wiring consists of outdoor cables and enclosed cables and shall be relocated between the camera assembly, pan and tilt unit and the camera control receiver, and shall consist of outdoor cables and enclosed cables.

A new bonding wire shall be provided between the junction box and the Type 334-TV cabinet.

All existing cables shall be:

- Installed without damaging the conductors or insulation.

- Installed without kinks.

- Handled in accordance with manufacturers specifications and recommended bending radius.

- Run continuously between terminations without splices.

- Installed with sufficient slack for equipment movement.

- Neatly tagged at both terminations to indicate source, destination and function.

The Contractor shall test the cables for continuity prior to and after relocation.

Existing Outdoor Cables

The existing outdoor cables shall be relocated between the camera junction box, the pan/tilt unit and the camera assembly.

New Neoprene tubing shall be installed between the camera junction box and the pan and tilt unit. The existing outdoor cables and connectors shall be installed to allow removing the camera and the camera housing without removing the pan and tilt unit.

Existing Enclosed Camera Control Cables

The existing enclosed camera control cables connects the camera junction box to the camera control receiver located in the cabinet and consists of:

- One -- RG6A/U coaxial cable.

- One -- No. 8 AWG bonding wire.

- One -- 9 pair conductor, No. 18 AWG, tinned copper stranded, individually shielded control cable:

- One -- 12 pair conductor, No. 18 AWG, tinned copper stranded, individually shielded cable.

The cables between the junction box and the CCR have a MIL-C-26482, 21 contacts - 16 AWG connector receptacle on one end, and shall be compatible with the CCR at the other end.

RELOCATE EXISTING MODEL 170 BASED CABINETS

Foundations for housing Type 1 shall conform to the details shown on the plans for Model 332 and 334 cabinets. Foundations for housing Type 2 shall conform to the details for Type M/336 Cabinets. Foundations for housing Type 2 shall conform to the details for Type G Cabinets.

RELOCATE EXISTING TYPE 334-TV CABINET

The existing Type 334-TV cabinet includes a Model 170 based cabinet, power distribution assembly, thermostatically controlled fan, door locks, 19-inch equipment racks, all necessary mounting hardware and wiring, foundation and anchor bolts and other equipment as shown on the plans and specified in these special provisions. The Model 170 based cabinet is specified elsewhere in these special provisions.

The Contractor shall construct each relocated Type 334-TV cabinet foundation as shown on the plans including furnishing and installing anchor bolts, and shall make all field wiring connections to the cabinet.

The Contractor shall provide all necessary mounting hardware and wiring to relocate or modify the existing cabinets as shown on the plans. The Contractor shall test all cabinet assemblies and demonstrate the correct function of all controls in the presence of the Engineer.

The Contractor shall provide prime power to the relocated Type 334-TV cabinet and perform all internal wiring in accordance with these special provisions and plans.

All relocated or modified cabinet assemblies shall be tested to demonstrate the correct function of all controls in the presence of the Engineer.

RELOCATE EXISTING SINGLE VIDEO TRANSMITTER

The existing single video transmitter accepts any NTSC baseband video signal and convert it to an optical signal suitable for launching into singlemode fiber and a composite video signal at a level of 1.0 V peak to peak between sync tip and reference white, as measured on an oscilloscope. The transmitter shall operate as specified when the peak-to-peak value of the signal varies between 0.71 and 1.4 V. The nominal input impedance shall be 75 Ω and the return loss shall be at least 30 dB in compliance with EIA RS 250 medium haul for an unbalanced connection.

The Contractor shall perform testing before and after relocating the single video transmitter to verify that the single video transmitter and single video receiver are compatible, meet manufacturers specifications and the requirements of these special provisions.

Prior to installation, the operation of all equipment shall be verified using the same type of fiber it is to be installed with. The fiber optic path for each video link shall have been tested and verified in accordance with these special provisions and plans prior to the video transmitter installation.

The Contractor shall connect the correct optical pigtail to the optical connector on the video transmitters. The Contractor shall neatly train all pigtails together when routing them along the same path and the support rails in the equipment racks. No cables shall be installed with a bend radius less than the manufacturer's minimum recommended bending radius.

The Contractor is responsible for all testing and documentation required for approval and acceptance of the production, installation and operation at these materials and equipment. All indicators shall be verified to function correctly.

The Contractor shall input a video test signal into the single video transmitter and use a variable optical attenuator to set the optical power at the receiver to the single video receiver sensitivity level. The optical signal shall then be connected to the single video receiver with a monitor connected to its output. The Engineer shall then qualitatively assess the monitor output. The signal-to-noise and signal-to-low frequency noise shall be measured and recorded.

RELOCATE EXISTING SINGLE VIDEO RECEIVER

The existing single video receiver is connected to the single video transmitter by optical fiber to form a video link having a center wavelength in the range of 1300 nm to 1330 nm at 77° F. The video link is to provide point-to-point transmission and reception of a full motion NTSC baseband video signal using an optical fiber as the transmission medium.

The single video receiver receives the optical signal launched into the singlemode optical fiber by the corresponding video transmitter. The optical interface to the receiver is an ST-style connector. The video receiver uses a PIN photo diode or an avalanche photo diode to convert the optical signal into an electrical signal. The receiver sensitivity shall be defined as the minimum optical power required to operate at the minimum video link performance specifications.

The Contractor shall connect the correct optical pigtail to the optical connector on the video receivers. The Contractor shall neatly train all pigtails together when routing them along the same path and the support rails in the equipment racks. No cables shall be installed with a bend radius less than the manufacturer's minimum recommended bending radius.

RELOCATE EXISTING CAMERA ASSEMBLY

The existing camera assembly shall consist of a camera housing assembly, CCTV camera, CCTV camera lens, and external cable and connectors.

The Contractor shall verify that the units work in accordance with manufacturer's specifications before relocation. All CCTV camera location equipment shall also be tested after relocation as described elsewhere in these special provisions.

RELOCATE EXISTING CLOSED CIRCUIT TELEVISION CAMERA

The existing CCTV cameras operates under a full range of environmental and lighting conditions and shall provide clear and usable images.

The Contractor shall install and fully adjust the relocated CCTV camera with the associated lens, power supplies, housings, and all necessary cabling, etc., to make the assembly completely operational.

The Contractor shall firmly attach the existing CCTV camera to the housing. The Contractor shall exercise care to tighten the camera mount within the torque limits specified by the camera manufacturer.

The Contractor shall properly terminate all of the electrical cables to the existing CCTV camera and firmly attach them.

The existing CCTV camera shall be mounted in the housing within 1/4-inch of the optical window. This distance is measured with the lens attached and adjusted to its maximum physical length.

The Contractor shall mount the existing CCTV camera in the housing such that the lens is centered in the optical window.

The Contractor shall adjust the back-focus adjustment on the existing CCTV camera such that the lens focus is properly set and maintained over the zoom range. This adjustment shall be made such that when the zoom is adjusted from long range (telephoto) to wide angle that no refocusing is necessary.

RELOCATE EXISTING CLOSED CIRCUIT TELEVISION CAMERA LENS

The existing CCTV camera lens work properly in conjunction with the camera as well as all of the other video system components.

The Contractor shall adjust the back-focus adjustment on the existing CCTV camera such that the lens focus is properly set and maintained when adjusting the focal length from zoom to wide angle. The Contractor shall make this adjustment with the lens iris at full open position. This adjustment shall be made such that when the zoom is adjusted from long range (telephoto) to wide angle, no refocusing is necessary.

The Contractor shall properly terminate the motorized iris electrical cable and connect it between the lens and the camera body.

RELOCATE EXISTING CAMERA HOUSING

The existing camera housings houses the camera and CCTV camera lens and include a sun shield or shroud. It protects the existing camera and CCTV camera lens from rain, dust, wind and other elements. The existing camera housing shall be relocated and mounted to the pan and tilt unit specified elsewhere in these special provisions.

If the relocated cameras have low centerline profile, then the contractor shall provide a means of elevating the existing camera for proper lens clearance. The Contractor shall position the lens in the center of the housing window.

Upon completion of the installation by the Contractor, the Engineer shall verify proper installation of the housing and the camera and lens assembly.

10-3.34 COMMUNICATION EQUIPMENT

Except for verification and testing of the condition of the existing system before and after the construction, the scope of the Contractor's work shall be defined on the plans between Baldwin Avenue and San Gabriel Valley (SGV) Communication Hub Building at Route 605 and Route 10 separation.

The Contractor shall arrange to have a technician, qualified to work on the existing communication equipment and employed by the communication equipment manufacturer or his representative, present at the time the equipment is being worked on.

WORK AT THE EXISTING SAN GABRIEL VALLEY COMMUNICATION HUB

The existing San Gabriel Valley (SGV) communication hub is located at the Route 10 and Route 605 separation.

Work at the existing SGV communication hub shall consist of connecting 12 and 36 SMFO cables and other ancillary and incidental cables to and between the main distribution frame, the fiber distribution frame and the various existing equipment housed in the hub as shown on the plans and as directed by the Engineer.

The various existing equipment include the FDU, video demultiplexer, video demultiplexer, video switch, video receiver, DS-1 optical modem, digital cross connect switch and C-12 SONET (synchronous optical network) ADM.

All new cables shall be routed in the existing cable trays.

Attention is directed to "System Testing and Documentation" regarding testing the communication hub equipment.

EXISTING D4 CHANNEL BANK

The existing D4 channel bank (time division multiplex) equipment, including a DS-1 optical modem, will be used to digitize the narrow bandwidth analog and quasi-analog signals and to time-division multiplex them into a 1.544 Mbps composite data signal.

The existing D4 channel bank is fully configured to house up to 24 DS-O channel cards at 64 kbps framing with 8 kbps overhead and shall multiplex up to 24 voice or data channels for transmission over a DS-1 data channel.

The existing D4 channel bank includes D4 common card and the following channel cards:

- 4-wire analog with E & M signaling - (4WE&M)
- 4-wire transmit only (4 WTO)
- 2-wire Foreign Exchange - Subscriber (FXS)

The Contractor shall adjust the levels of the multiplex to achieve a 0 transmission level point (TLP) at the San Gabriel Valley communication hub building [hub Number 2].

The Contractor shall measure end-to-end performance of the analog and digital parameters under full operation.

10-3.35 COMMUNICATION SYSTEM CUTOVER

Communication system cutover is the orderly disconnection of existing communication facilities and the connection, activation, testing and placing into operation the new and relocated or modified communication system.

Communication cutover shall consist of the relocation and integration of the existing individual field sites. The integration and testing shall begin at the existing field sites of the fiber optic communication system affected by the Contractor's work with control from the existing San Gabriel Valley (SGV) communication hub building at Route 605 and Route 10 separation.

To minimize downtime of the system, cutover of field sites shall begin after the following tasks have been performed:

1. Perform pre-installation tests on all new material, equipment, and cable.
2. Install and test the entire new project cable plant.
3. Finish all works at the individual CMS, ramp metering, census station and TMS station field sites.
4. Install all termination cables and connectors in the existing San Gabriel Valley (SGV) communication hub building.
5. Test fiber optic cable links from the individual field sites to the existing San Gabriel Valley (SGV) communication hub building.
6. Perform subsystem testing on all channel cards, data links, video links and multiplexed video links affected by the Contractor's work.

All testing listed above shall be performed as described in "System Testing and Documentation," elsewhere in these special provisions.

The cutover of all individual CMS, ramp metering, census station and TMS station field sites shall follow the cutover plan, detailed on the Schematic as shown on the plans, on a circuit basis. No new cutover shall begin until the previous circuit cutover is completed.

The Contractor shall provide a detailed Cutover Plan to the Engineer for approval, at least 30 working days prior to the beginning of communication system cutover. The Contractor shall coordinate all cutover activity with the Engineer.

Full compensation for the communication system cutover, shall be considered as included in the contract lump sum price paid for system testing and documentation, and no separate payment will be made therefor.

10-3.36 SYSTEM TESTING AND DOCUMENTATION

The system testing and documentation shall cover pre-installation testing, sub-system testing, fiber optic cable testing, twisted pair cable testing, data link testing, video link testing, acceptance testing, physical inspection, functional testing, performance testing, final acceptance and system documentation that is required to validate the operational performance of the communication system and described elsewhere in these special provisions.

Except for verification and testing of the condition of the existing system before and after the new system is installed, the scope of the Contractor's work shall be defined on the plans between Baldwin Avenue and San Gabriel Valley (SGV) Communication Hub Building at Route 605 / Route 10 separation.

As built plans for the existing communication system are available for inspection at the Department of Transportation, Construction Office, 120 South Spring Street, Room 244, Los Angeles, California 90012, telephone (213) 897-0054.

Test Plan.--The Contractor shall develop and submit within 21 working days to the Engineer an installation and test plan for approval, which details the method of installation, relocation or modification and all testing for all new and relocated or modified (existing) material, equipment, and cable and the associated schedule of activities, based on these special provisions, plans, the manufacturer's recommended test procedures, and industry standard practices. Two copies of the test plan shall be submitted to the Engineer for approval. The Engineer will review then approve or disapprove the plan within four weeks. If the Engineer rejects the test plan the Contractor shall submit a revised test plan within 20 working days for review and approval by the Engineer. No testing shall be performed until the Contractor's test plan has been approved by the Engineer. The tests shall demonstrate that the design and production of material and equipment meet the requirements of these special provisions and plans.

All test results, including results of failed test or re-tests, shall be submitted and delivered to the Engineer and a copy placed with the equipment at the site. All test equipment shall be supplied by the Contractor.

The Contractor shall notify the Engineer of his intent to proceed with functional and sub-system testing 48 hours prior to commencement of each test. Sub-system testing and inspections shall include visual inspection for damaged in correct installation, adjustments and alignment, and measurement of parameters and operating conditions.

Pre-construction Testing.--Pre-construction testing shall include testing of all existing material, equipment and cable at the field site prior to relocation or modification of the existing elements of the fiber optic and CCTV communication systems.

Pre-construction testing shall also include testing of all of the following field element:

CCTV Location SB 311 – PM 31.1 Eastbound Route 10 west of Route 605 / Route 10 separation.
CCTV Location SB 303 – PM 30.3 Eastbound Route 10 west of Durfee Avenue.
CCTV Location SB 295 – PM 29.5 Eastbound Route 10 at Peck Road / Valley Boulevard.
CCTV Location SB 285 – PM 28.5 Eastbound Route 10 west of Santa Anita Avenue.
The San Gabriel Valley (SGV) Communication Hub Building at the Route 605 / Route 10 separation.

All active equipment shall be connected to normal operating power, energized and subjected to normal operating conditions for a continuous period of time of not less than 48 hours.

The functional tests shall be performed in accordance with an approved test plan. Any material or equipment which fails to meet the specifications shall be repaired or replaced as directed and scheduled by the Engineer. All functional test results, including results of failed tests or re-tests, shall be documented, submitted to and approved by the Engineer.

Pre-Installation Testing.--Pre-installation testing shall include testing of all new material, equipment and cable in a laboratory environment prior to delivery to the site. Use of laboratory facilities, including an environmental simulation chamber, shall be arranged by the Contractor. The tests shall either be conducted at the manufacturer's premises or at a laboratory arranged by the Contractor.

All material, except test equipment and special tools, shall be bench tested in accordance with the following paragraphs, which include those items described elsewhere requiring pre-installation testing for each individual item where applicable.

All active equipment shall be connected to normal operating power, energized and subjected to normal operating conditions for a continuous period of time in the laboratory of not less than 48 hours.

Functional testing shall be performed by the manufacturer on all material prior to delivery to the site. The functional tests shall be performed in accordance with an approved test plan. Any material or equipment which fails to meet the requirements of the contract shall be repaired or replaced and the test shall be repeated until satisfactory. All functional test results, including results of failed tests or re-tests, shall be submitted and delivered with all material and equipment delivered to the site.

Full performance test shall be performed by the manufacturer or by the Contractor on not less than 5 percent or at least one unit of material selected at random from the normal production run. The full performance test shall be performed in accordance with a test plan developed by the Contractor and approved by the Engineer.

Sub-system Testing.--Sub-system testing shall encompass the testing of all new and relocated or modified material, equipment and cable after installation, but prior to acceptance tests. These tests shall be done in accordance with the performance testing called under each individual item in these special provisions.

New and relocated or modified equipment and hardware shall be installed in accordance with the plans and special provisions. All new and relocated or modified material, equipment and cable shall be tested after installation at the site. Sub-system testing and inspections shall include visual inspection for damaged or incorrect installation, adjustments and alignment, and measurement of parameters and operating conditions. The Contractor shall notify the Engineer of his intent to proceed with sub-system testing 48 hours prior to commencement of each test.

Installation documentation and test results shall be provided for all new and relocated or modified material, equipment and cable prior to commencement of acceptance tests. Installation documentation shall be in accordance with these special provisions and shall include the following as appropriate:

- Model, part number and serial number for all material and equipment.
- Test equipment model number, serial number, settings, and date of last calibration.
- All strap and switch settings.
- Record of all adjustments and levels.
- Alignment measurements.
- Identification of interconnections.
- All factory, laboratory and site test results.

Fiber Optic Cable Testing.--Attention is directed to "Fiber Optic Testing" elsewhere in these special provisions.

Twisted Pair Cable Testing.--The twisted-pair cable testing consists of testing the trunk cable and drop cable. After all cable pairs are terminated, the Contractor shall test the continuity of the cable, looking for grounds, opens, shorts, and splits. Any anomalies shall be corrected.

The Contractor shall measure and record the loop resistance and insulation integrity of all twisted-pair between terminations. The measured value shall not deviate from the calculated loop resistance of the cable by more than 10 percent.

Video Link Testing.--The video link testing shall be conducted after the Contractor submits a test plan and receives approval from the Engineer, based on these special provisions, plans and the manufacture's recommended test procedures for the equipment involved. Measurements shall be made from the baseband-in to baseband-out connections. A video communication link shall include a single video transmitter, a single video receiver, interconnecting optical fiber, connectors and power supplies. The video link is to provide point-to-point transmission and reception of a full motion NTSC baseband video signal using an optical fiber as the transmission medium. Video system performance tests for any particular video link shall be performed after the associated camera has been installed and tested.

Each video link in the communication system shall be tested with a video test signal at the single video transmitter input. The Contractor shall perform all level adjustments and alignments required on the video link in order for it to operate in accordance with these special provisions. If any video link fails to meet the performance requirements, the Contractor shall take all steps necessary to restore the failed link to the required performance.

Each video link in the communication system shall be tested for qualitative performance with its associated camera turned on and connected to the BNC connector of the video link transmitter. The Contractor shall measure and record the received optical power at the optical connector of the single video receiver from the single video transmitter under test using a 90 percent APL (average picture level) flat field input to the transmitter. The Contractor shall measure, record and tabulate a single video receiver dynamic range at the optical connector of the single video receiver from the video transmitter under test using a 90 percent APL (average picture level) flat field input to the single video transmitter. To do this the measured optical attenuation of the fiber being used shall be increased to the point at which the video test set just begins to show a 3 dB degradation of the video signal to noise ratio in accordance with EIA 250 video test procedures. The optical receive power into the single video receiver shall be measured and recorded. Then the optical attenuation shall be decreased until the video test set once again shows degradation of the video and registers errors. At no time shall the optical power into the receiver exceed the manufacturer's specified saturation level. The optical receive level shall once again be measured and recorded. These minimum and maximum receive levels define the single video receiver dynamic range and shall meet or exceed the specifications as specified elsewhere under these special provisions. This measurement shall be repeated for each video link affected by the Contractor's work. The video test set shall be approved by the Engineer. The Contractor shall measure and record the baseband video output level from the single video receiver under test. This measurement shall be repeated for each video link affected by the Contractor's work.

The output video signal shall be connected to a video display monitor. The observed picture on the video display monitor shall be assessed for qualitative performance. All qualitative comments shall be recorded for each camera. The Contractor shall measure, record and tabulate the single video receiver dynamic range at the optical connector of the video demultiplexer's single video receiver from the video multiplexer's single video transmitter under test. To do this the measured optical attenuation of the fiber being used shall be increased to the point at which the video test set just begins to show a 3 dB degradation of the video signal to noise ratio in accordance with EIA 250 video test procedures. The optical receive power into the single video receiver shall be measured and recorded. Then the optical attenuation shall be decreased until the video test set once again shows degradation of the video and registers errors. At no time shall the optical power into the single video receiver exceed the manufacturer's specified saturation level. The optical receive level shall once again be measured and recorded. These minimum and maximum receive level define the single fiber optic video transceiver (receiver)'s dynamic range and shall meet or exceed the specifications as specified elsewhere under these special provisions. This measurement shall be repeated for each video link affected by the Contractor's work for the following performance characteristics. . The video test set shall be approved by the Engineer.

The Contractor shall measure, record and demonstrate that the performance meets or exceed the specified EIA RS-250 requirements listed below:

- Differential gain.
- Differential phase.
- Chrominance to luminance delay inequality.
- Amplitude vs. frequency characteristics.
- Frequency response characteristic.
- Signal to noise ratio.
- Signal to low frequency noise.
- Signal to periodic noise.
- Output signal level.

Channel Card Testing.--The channel card testing shall be conducted after the Contractor submits a test plan and receives approval from the Engineer, based on these special provisions, plans and the manufacture's recommended test procedures for the equipment involved. The Contractor shall test all channel cards and record the results in accordance with the approved installation and test plan. The Contractor shall test DS1 optical modem and D4 channel banks at the San Gabriel Valley (SGV) communication hub building including all equipment located in the field, as specified elsewhere in these special provisions.

Channel card testing shall consist of functional and performance tests conducted between the D4 channel bank multiplex in the field and DS1 optical modems at the existing San Gabriel Valley (SGV) communication hub building and the D4 channel bank multiplex at the TMC. The audio channel shall be verified in both directions using telephone instruments. The signaling system shall be verified in both directions. Circuits shall be fully tested to the channel card manufacturer's specification using a transmission impairment measuring set (TIMS).

Data link testing.--The data link testing shall be conducted after the Contractor submits a test plan and receives approval from the Engineer, based on these special provisions, plans and the manufacture's recommended test procedures for the equipment involved. Data link testing is for the alignment and testing of the data system. The activities shall include verification of all data circuits in the low speed data links, high speed data ring network and in the integrated data system. The Contractor shall adjust levels required for the data system to operate.

Data link tests shall be conducted in two phases:

1. Channel card checkout.--Channel card checkout shall consist of functional tests conducted between the D4 channel bank multiplex at the data nodes and each system element as shown in the plans. The audio channel shall be verified in both directions using telephone instruments. The signaling system shall be verified in both directions. In addition for circuits using 4 WTO channel cards for modems, bit error rate (BER) tests shall be conducted using appropriate model 400, 1200 BPS modem or ITU compatible high speed modem, and a bit error rate test set (BERTS) shall be used to verify error free transmission for five minutes at the bit rate to be employed in the system.

2. Data link performance.--Data link performance tests shall be conducted between the D4 channel bank multiplex at the data nodes and each field cabinet location.

Records of all tests shall be delivered to the Engineer. Circuits shall be fully tested to the channel card manufacturer's. Modem manufacturer required channel specification shall be measured. In addition, end-to-end bit error rate tests (BERTS) shall be conducted using the type modem to be employed on the link at the bit rate to be employed. The bit error rate tests (BERTS shall be with the modem at the equipment site(s) configured in a loop back and with the test setup at the node. BER tests shall be a minimum of 3 hours for each circuit exactly and fully configured for operation in accordance with these special provisions and the Plans including required bridges.

All circuits shall provide an error rate less than 1×10^{-6} .

Acceptance Testing.--The acceptance testing shall be conducted in accordance with the approved test plan. The acceptance testing shall include conducting acceptance tests and subsequent retest, and documentation of the test results.

Final acceptance tests shall be conducted after the site and sub-system test results have been reviewed and accepted by the Engineer. These tests include the complete system in normal operations. The test plan shall address the full testing requirements of the specifications. The test plan shall detail all tests to be performed, the test results which are expected and the test schedule. The acceptance test plan shall include the following major test and acceptance categories:

- Physical inspection.
- Functional tests.
- Performance tests.

The Contractor shall test the communication system according to the approved acceptance test plan and shall provide all test equipment, labor and ancillary items required to perform the testing. The test equipment shall be certified to be calibrated to the manufacturer's specifications. The model and part numbers and date of last calibration of all test equipment shall be included with the test results.

Acceptance testing shall not commence until all material required by these special provisions and plans are delivered, installed, and aligned and all production test and site test documentation and results have been approved by the Engineer.

All acceptance test results shall be fully documented and such documentation provided as a condition of acceptance.

Physical Inspection.--The Contractor shall provide documentation to prove delivery of all new material, equipment, cable and documentation. If any material or documentation is outstanding or have been replaced under pre-acceptance warranty a physical inspection and documentation shall be provided for this material. The physical inspection shall consist of inspecting all installed material to ensure workmanship satisfies the specified requirements.

Functional Tests.--The Contractor shall test all system functions to demonstrate that all circuits (video, data, and voice), cameras, camera control and all equipment satisfies the functional requirements of the specifications.

This testing shall include subjective testing of each camera image and verification of camera control from the camera control receiver. The connectivity of each data channel shall be demonstrated. The Contractor shall document all functional test results. In the event that any aspect of the functional tests are determined by the Engineer to have failed, the Contractor all cease all acceptance testing and determine the cause of the failure and make repairs to the satisfaction of the Engineer. Acceptance testing shall, at the discretion of the Engineer, be repeated beginning from the start of functional tests.

Performance Tests.--The Contractor shall conduct operational performance tests on the following:

Affected video links from the relocated or modified CCTV camera to the existing San Gabriel Valley (SGV) communication hub building.

Affected data circuits operational from the existing San Gabriel Valley (SGV) communication hub building to the existing system element located in the field

Video tests shall satisfy the end-to-end performance requirements under normal operating conditions. Video tests shall be measured with the camera video output transmitting a video signal at the input of the video display monitors. The Contractor shall test the video sub-system and record the results.

The video signal to noise shall be measured according to EIA-250. The video signal to noise ratio shall be measured and recorded with both the camera providing the video input reference and with suitable video test equipment providing the video reference signal. When the source is the test equipment, the video signal to noise ratio shall be greater than 47 dB.

Adjustments shall be calculated to account for any deviation in output level of the camera resulting from the variable light conditions, the automatic iris and associated automatic gain control. The resulting video signal to noise ratio shall be recorded.

The video signal to low frequency noise ratio shall be measured according to EIA-250. The resulting video signal to low frequency noise ratio shall be greater than 39 dB. If an AGC circuit does not allow measurement as per EIA-250, the Contractor shall submit an alternative test plan for approval.

The video signal to periodic noise ratio shall be measured according to EIA-250. The resulting video signal to periodic noise ratio shall be greater than 52 dB.

Data tests shall be performed on all operational and voice data circuits affected by the Contractor's work using appropriate test equipment for the measurement of the following parameters:

End-to-end bit error rate tests shall be run from the data nodes and cable node to each remote drop of each data Circuit A data test set shall be used at both the cable node and the remote modems to insert an asynchronous pseudo-random pattern using 8 data bits, 1 start bit, 1 stop bit and even parity. The data test set at the remote modem must hold RTS high for the duration of the data test. The data rate of the test sets shall be set to rate as employed in the system.

A 15 minute test on each drop of each multipoint circuit shall be error free in both directions. One drop of each circuit as chosen by the Engineer shall be tested for 72 hours. The average bit error rate in both directions shall be less than 1×10^{-6} at 9600 bps.

The round-trip propagation delay for each model 170-based controller circuit shall be measured by using a loop back connector on the slave modem furthest from the master. The loop back connector shall connect pin 2 to 3, 8 to 4, and 6 to 20 of the DB-25 connector. A data test set capable of measuring delay shall be used at the data node. The test shall be repeated 3 times and the average value calculated.

Pulse-width distortion shall be defined as the difference between the data pulse width into a data channel port at the communication building port and the pulse width out of the EIA-232C port of an interconnected drop modem.

Distortion shall be tested between the existing San Gabriel Valley (SGV) communication hub building and the selected field modem for each data circuit. The signal shall not have a gross span-stop distortion greater than 20 percent at any data interface measured as per EIA-404-A.

If any circuit or element fails to satisfy the specified performance requirements the Contractor shall determine the cause and correct the failure to the satisfaction of the Engineer. The full performance tests shall be repeated under operating conditions as determined by the Engineer.

SYSTEM DOCUMENTATION

The Contractor shall submit a draft copy of all documentation for review and approval prior to production of documentation. The Engineer will review and approve or reject the draft documentation within four weeks of receipt.

The Contractor shall modify the documentation if required and submit provisional documentation. The Engineer will approve or reject the provisional documentation within three weeks of receipt. The Contractor shall arrange for re-submission in a timely manner to meet the schedule in the case that the documents are rejected.

Draft documentation shall be submitted eight weeks prior to the start of installation. The draft documentation shall show the general approach in preparing the final manuals.

Upon approval of the draft documentation provisional documentation shall be supplied three weeks prior to the start of site testing. The provisional documentation shall be of the same format as the final manuals but with temporary insertion for items which cannot be finalized until the system is completed tested and accepted. Final documentation shall be submitted no later than four weeks after completion of the acceptance tests and shall incorporate all comments made during the approval stages. The Contractor shall be responsible for all delay caused by non-compliance to the specified requirements.

Final documentation shall be approved prior to its production. ten copies of all final documents shall be delivered. The copies shall be 8.5 x 11 inch paper and bound in three-ring hard-covered binders complete with dividers. System documentation shall be arranged in an operation and maintenance (O & M) manual format providing all the information necessary to reflect the changes made by the Contractor to the existing system. The operation and maintenance manual shall as a minimum consist of the following sub-section as described below:

Master Items Index.--This shall be the first section of the O & M manual. The section shall describe the purpose of each manual and brief description to the directory of the manual. It shall also reference equipment manuals as required for additional and support material.

System Description and Technical Data.--This section shall contain an overall description of the system and associated equipment and cables with illustrative block diagrams. This section shall identify all equipment and cables in the system stating the exact module and option number that are employed in the system. Technical data specification and settings for every type of equipment or cable shall be provided. Any modification that has been done on the equipment shall be clearly described.

Corrective Maintenance.--The manual shall include fault diagnostic and repair procedures to permit the location and correction of faults to the level of each replaceable module. Procedures shall include alignment and testing of the equipment following repair, the test equipment, tools, diagnostic software required and the test set up.

Preventative Maintenance.--The manual shall include procedures for preventative maintenance in order to maintain the performance parameters of the system, equipment and cables within the requirements of the specifications.

Parts List.--The manual shall include a list of all replaceable parts with exact parts description and number and a directory of recommended suppliers with correspondence address, telephone and fax numbers.

Test Results.--This section shall include a copy of the results for all the tests that have been conducted for the contract.

Revised Manuals.—Ten complete sets of revised manuals shall be provided. The manuals shall, at a minimum, include any updates and his revisions of the following, caused by the Contractor's work:

- A. Complete and accurate Block Diagrams. Complete installation and turn-on procedures.
- B. Complete performance specifications (functional, electrical, mechanical and environmental) identified by a universal part number such as JEDEC, RETMA, or EIA.
- C. Complete maintenance and trouble-shooting procedures.
- D. Complete stage-by-stage explanation of operation.

System schematic drawings shall be provided to identify changes made by the Contractor to the existing system. The drawings shall also show how the system is interconnected. A comprehensive list of cabling and wiring updates shall be provided to clearly identify the interconnection and labeling of all existing equipment in the field and at the existing San Gabriel Valley (SGV) communication hub building.

FINAL ACCEPTANCE

The final acceptance of system testing and documentation will not occur until all of the following conditions have been met as follows:

Physical, functional, and full performance acceptance tests have been completed and the results are approved by the Engineer.

All documentation has been completed and submitted to the Engineer.

All connections that were changed to perform acceptance tests are restored and tested.

10-3.37 REMOVING, REINSTALLING, DISPOSING OR SALVAGING ELECTRICAL EQUIPMENT

Salvaged electrical materials shall be hauled to a location within 30 miles of the project site as directed by the Engineer, and stockpiled.

The Contractor shall provide the equipment, as necessary, to safely unload and stockpile the material. Prior to delivery, the Contractor shall call the Recycling Center at (909) 629-3577, and provide a minimum of 3 working days' notice.

The third paragraph of Section 86-7.01, "Removing Electrical Equipment," of the Standard Specifications is amended to read:

Attention is directed to the provisions in Section 7-1.11, "Preservation of Property," of the Standard Specifications "Indemnification and Insurance" of the special provisions. The Contractor will be required to repair or replace, at the Contractor's expense, any electrical equipment to be salvaged which, as determined by the Engineer, has been damaged or destroyed by reason of the Contractor's operations.

The fourth paragraph of Section 86-7.02, "Reinstalling Removed Electrical Equipment," of the Standard Specifications is amended to read:

Existing materials required to be reused and found to be unsatisfactory by the Engineer shall be replaced by new material and the cost therefor will be paid for as extra work as provided in Section 4-1.03D.

10-3.38 PAYMENT

The contract lump sum price or prices paid for signal and lighting shall include highway lighting at intersections in connection with signals only.

All other roadway lighting on the project shall be considered as included in the contract lump sum price paid for lighting and sign illumination.

Full compensation for hauling and stockpiling electrical materials shall be considered as included in the contract price paid for the item requiring the material to be salvaged, and no additional compensation will be allowed therefor.

The first paragraph of Section 86-8.01, "Payment," of the Standard Specifications is amended to read:

The contract lump sum price or prices paid for signal, ramp metering, flashing beacon, lighting, sign illumination, traffic monitoring station, highway advisory radio systems, closed circuit television system, or combinations thereof; for modifying or removing those systems; for temporary systems; or the lump sum or unit prices paid for various units of those systems; or lump sum or per meter price paid for conduit of the various sizes, types and installation methods listed in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing and installing, modifying, or removing the systems, combinations or units thereof, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer, including any necessary pull boxes (except when the type required is shown as a separate contract item); excavation and backfill; concrete foundations (except when shown as a separate contract item); pedestrian barricades; furnishing and installing illuminated street name signs; installing State-furnished sign panels on pedestrian barricades, on flashing beacon standards, and on traffic signal mast arms; restoring sidewalk, pavement and appurtenances damaged or destroyed during construction; salvaging existing materials; and making all required test.

The contract lump sum price paid for relocate changeable message sign system shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in relocate changeable message sign system at location 67 and the tubular sign structure and installing new foundation, complete in place, including all the electrical and civil work on the project, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit price paid for irrigation controller enclosure cabinet shall include full-compensation for furnishing all labor, materials, tools, equipment (including rain sensor units), and incidentals, and for doing all the work involved in fabricating and installing irrigation controller enclosure cabinets, complete in place, including constructing foundations, pull boxes, pads and conduits to pull box adjacent to cabinets, and installing equipment within the cabinets, except controllers, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit price paid per linear foot for conduit of various sizes, types and installation methods listed in the Engineer's Estimate or the lump sum price paid for the various items of work requiring conduit, shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing the conduit, complete in place, including all trenching and backfill material required and pull boxes not otherwise paid for, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract price paid per linear foot for 1-1/4 inch innerduct shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in 1-1/4 inch innerduct, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract lump sum price paid for communication conduit shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in communication conduit, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit price paid per linear foot for two 4" conduit (attached to bridge) and sprinkler control conduit (bridge) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in two 4" conduit (attached to bridge) and sprinkler control conduit (bridge), complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract lump sum price paid for electric service (irrigation) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing electric service (irrigation) for irrigation controllers, complete in place, including conductors, conduit and pull boxes to the pull box adjacent to irrigation controller enclosure cabinets and irrigation controllers, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract lump sum price paid for modify census station system shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in relocating and installing the census station system, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract lump sum price paid for modify closed circuit television system at various locations shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in relocating and modifying closed circuit television system at various locations, complete in place, including installing new camera pole and foundations for Type 334-TV cabinets and any ancillary or incidental items required to provide fully equipped system and operating at each location, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract lump sum price paid for work at the San Gabriel Valley Communication Hub shall include full compensation for furnishing and testing all labor, materials, tools and incidentals and for doing all the work involved installing, connecting and terminating various cables to and between various exiting communication equipment housed in the San Gabriel Valley (SGV) Communication Hub Building, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer..

The contract lump sum price paid for lighting undercrossing at various locations shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in lighting undercrossing at various locations, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract lump sum price paid for lighting (Union Pacific Rail Road) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in lighting (Union Pacific Rail Road), complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit price paid per linear foot for fiber optic cable of the types and sizes listed in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in fiber optic cable of the types and sizes involved, complete in place, including fiber optic testing, fiber distribution unit, marking and labeling fiber optic cable assemblies, break out cables, connectors, cable tray and splicing, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit price paid for fiber optic splice closure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in fiber optic splice closure, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit price paid for twisted pair splice closure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in twisted pair splice closure 12 inches and twisted pair splice closure 24 inches complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit price paid per linear foot for conductors of the sizes listed in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in conductors of the sizes, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit price paid per linear foot for 4 No. 18 telephone cable shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in 4 No. 18 telephone cable complete

in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit price paid per linear foot for twisted pair cable of the sizes listed in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in twisted pair cable of the sizes involved complete in place, including protected terminal blocks, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit price paid for pull boxes of the size and types listed in the Engineer's Estimate, including communication pull boxes, shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in the installation of pull boxes, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit price paid for splice vault shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in splice vault, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract lump sum price paid for interim ramp metering system shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in interim ramp metering system, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract lump sum price paid for system testing and documentation shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in system testing and documentation, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for remove, salvage and disposing existing equipment at various locations shall be considered as included in the contract lump sum price paid for the various items of work requiring removing and salvaging equipment and no separate payment will be made therefor.

Full compensation for any technician from a manufacturer shall be considered as included in the contract price paid for the items involved and no additional compensation will be allowed therefor.

SECTION 11. MODIFIED STANDARD SPECIFICATION SECTIONS

SECTION 11-1. QUALITY CONTROL / QUALITY ASSURANCE

Asphalt concrete shall conform to the provisions in this Section 11-1, "Quality Control / Quality Assurance," and the section entitled "Asphalt Concrete" in Section 10-1, "General," of these special provisions. Section 39, "Asphalt Concrete," of the Standard Specifications shall not apply to Type A and Type B asphalt concrete.

SECTION 39: ASPHALT CONCRETE

39-1 GENERAL

39-1.01 DESCRIPTION

This work shall consist of furnishing and mixing aggregate and asphalt binder at a central mixing plant, transporting, spreading and compacting the mixture, and furnishing and placing pavement reinforcing fabric, in conformance with this Section 11-1, "Quality Control / Quality Assurance," and with "Asphalt Concrete" in Section 10-1, "General," of these special provisions.

The Contractor shall be responsible for controlling the quality of the asphalt concrete product entering the work, including aggregate, asphalt binder, additives, and asphalt concrete mixture; for controlling the quality of the work performed, including mix design, and mixing, transporting, spreading, and compacting the asphalt concrete; for controlling the quality of the finished roadway surface; and for developing, implementing, and maintaining a quality control program. The Contractor shall be responsible for the inspection, sampling, and testing required to control the quality of the asphalt concrete and the work performed.

The inspection, sampling, and testing required to control the quality of the workmanship and the asphalt concrete shall conform to this Section 11-1. Sampling shall be in conformance with the requirements of this Section 11-1 and with California Test 125. Testing shall be performed using California Tests unless otherwise directed by the Engineer or this Section 11-1.

Asphalt concrete is designated as Type A or Type B. The type of asphalt concrete will be shown on the plans or specified in "Asphalt Concrete" in Section 10-1, "General," of these special provisions.

39-2 MATERIALS

39-2.01 ASPHALTS

Asphalt binder to be mixed with aggregate shall be steam-refined paving asphalt conforming to the provisions in Section 92, "Asphalts," of the Standard Specifications. Asphalt binder shall be Grade AR-4000 unless the grade is designated in "Asphalt Concrete" in Section 10-1, "General," of these special provisions.

Liquid asphalt for prime coat shall conform to the provisions in Section 93, "Liquid Asphalts," of the Standard Specifications and shall be the grade designated by the contract item or conform to the provisions in "Asphalt Concrete," in Section 10-1, "General," of these special provisions.

Asphalt emulsion for paint binder (tack coat) shall conform to the provisions in Section 94, "Asphaltic Emulsions," of the Standard Specifications for the rapid-setting or slow-setting type and grade approved by the Engineer.

Paving asphalt to be used as a binder for pavement reinforcing fabric shall be a steam-refined paving asphalt conforming to the provisions in Section 92, "Asphalts," of the Standard Specifications, and shall be Grade AR-4000, unless otherwise ordered by the Engineer or designated in "Asphalt Concrete" in Section 10-1, "General," of these special provisions.

39-2.02 AGGREGATE

Aggregate and combined aggregate shall conform to the quality and gradation provisions in this Section 11-1, "Quality Control / Quality Assurance," for the asphalt concrete types and sizes conforming to the provisions in "Asphalt Concrete" in Section 10-1, "General," of these special provisions.

Aggregates shall be clean and free from decomposed or organic materials and other deleterious substances. Coarse aggregate is material retained on the No. 4 sieve, fine aggregate is material passing the No. 4 sieve, and supplemental fine aggregate is added fine material passing the No. 30 sieve, including, but not limited to, cement and stored fines from dust collectors.

The target value for the percent passing each designated sieve size for the aggregate blend used in the proposed asphalt concrete mix design shall fall within the "Target Value Limits" of the following table:

Table 39-1 - AGGREGATE GRADATION
Type A and Type B Asphalt Concrete
Percentage Passing

3/4" Maximum, Coarse		3/4" Maximum, Medium	
Sieve Sizes	Target Value Limits	Sieve Sizes	Target Value Limits
1"	100	1"	100
3/4"	90-100	3/4"	90-100
3/8"	60-75	3/8"	65-80
No. 4	45-50	No. 4	49-54
No. 8	32-36	No. 8	36-40
No. 30	15-18	No. 30	18-21
No. 200	3-7	No. 200	3-8

1/2" Maximum, Coarse		1/2" Maximum, Medium	
Sieve Sizes	Target Value Limits	Sieve Sizes	Target Value Limits
3/4"	100	3/4"	100
1/2"	95-100	1/2"	95-100
3/8"	75-90	3/8"	80-95
No. 4	55-61	No. 4	59-66
No. 8	40-45	No. 8	43-49
No. 30	20-25	No. 30	22-27
No. 200	3-7	No. 200	3-8

During asphalt concrete production, aggregate gradation shall be within the limits specified in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1. Conformance with the grading requirements shall be determined by California Test 202, modified by California Test 105, when there is a difference in specific gravity of 0.2 or more between the coarse and fine portions of the aggregate or between the blends of the different aggregates. The percent passing the No. 200 sieve shall be reported to the first decimal place (tenths).

The combined aggregate shall conform to the following quality requirements prior to the addition of the asphalt binder:

Table 39-2 - AGGREGATE QUALITY REQUIREMENTS

Quality	California Test	Asphalt Concrete	
		Type A	Type B
Percent of Crushed Particles	205		
Coarse Aggregate (Min.)		90%	25%
Fine Aggregate (Passing No. 4, Retained on No. 8) (Min.)		70%	20%
Los Angeles Rattler	211		
Loss at 100 Rev. (Max.)		12%	
Loss at 500 Rev. (Max.)		45%	50%
Sand Equivalent (Min.) ¹	217	47	42
Kc Factor (Max.)	303	1.7	1.7
Kf Factor (Max.)	303	1.7	1.7

Note:

1. Reported value shall be the average of 3 tests split from a single sample.

39-2.03 ASPHALT CONCRETE MIXTURE

The asphalt concrete mixture, composed of the proposed aggregate blend and the proposed asphalt binder content as determined by California Test 367, shall conform to the following requirements:

Table 39-3 - ASPHALT CONCRETE MIXTURE REQUIREMENTS

Design Parameters	California Test	Asphalt Concrete Type and Location			
		Coast and Valley		Desert (per Engineer)	
		Type A	Type B	Type A	Type B
Hveem Stabilometer Value (Min.)	367 ^{1,2}	37	35	37	35
Percent air voids (Mix Design) (Start-Up Production Evaluation)	367 ¹	3-5 ³	3-5 ³	4-6 ⁴	4-6 ⁴
Swell ⁵ (in) (Max)	305	0.030	0.030	0.030	0.030

Notes:

1. Reported value shall be the average of 3 tests from a single split sample.
2. If the range of stability for the 3 briquettes is more than 12 points, the briquettes shall be discarded and new samples shall be fabricated.
3. Modify California Test 367, paragraph C5, to "most nearly 4%."
4. Modify California Test 367, paragraph C5, to "most nearly 5%."
5. Measured at Mix Design only.

During production and placement, the asphalt concrete mixture shall conform to the requirements of Table 39-4, "Minimum Process Control Requirements," and Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1. Changes in cold feed or hot bin proportions to conform to the aggregate grading requirements shall not be considered changes in the mix design.

Whenever asphalt concrete production has been suspended for longer than 30 days, the Contractor, on the first day of resumption of production, shall sample and test the asphalt concrete to demonstrate conformance with the requirements of Table 39-3, "Asphalt Concrete Mixture Requirements," Table 39-4, "Minimum Process Control Requirements," and Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1.

The target value for asphalt content may be changed by as much as ± 0.2 percent during the production start-up evaluation specified in Section 39-10.02A, "Production Start-Up Evaluation," of this Section 11-1 or after production start-up evaluation and before the first day of regular production with the Engineer's approval. The Contractor shall demonstrate that asphalt concrete that has been produced through the plant using the modified target value for asphalt content is in conformance with this Section 11-1 by submitting test results for samples obtained from the first 551 tons of production. Stability and percent air voids shall be determined using 3 briquettes constructed from a single sample taken from 4 locations across the mat in conformance with the requirements of California Test 125.

Changes from one mix design to another shall not be made during the progress of the work, unless approved by the Engineer. Changes in asphalt content, other than those allowed during the start-up evaluation process, or in aggregate grading target values shall be considered to be a change in the asphalt concrete mixture and shall require a new mix design proposal. Changes in the asphalt content or aggregate grading target values approved by the Engineer will not be applied retroactively for acceptance or payment.

39-2.04 PAVEMENT REINFORCING FABRIC

Pavement reinforcing fabric shall conform to the provisions in Section 88, "Engineering Fabrics," of the Standard Specifications.

39-3 ASPHALT CONCRETE MIX DESIGN PROPOSAL AND REVIEW

39-3.01 CONTRACTOR MIX DESIGN PROPOSAL

The Contractor shall submit for the Engineer's review a proposed asphalt concrete mix design for each asphalt concrete mixture to be used at least 14 days prior to production of that asphalt concrete mixture. The asphalt concrete mix design shall be prepared by a laboratory (or laboratories) whose proficiency has been reviewed and qualified in conformance with the Department's Quality Assurance Program. Aggregate quality and asphalt concrete mix design test results shall be no more than one year old when production of the asphalt concrete mixture starts. For projects of more than one year's duration, asphalt concrete may be produced using the asphalt concrete mix design that was reviewed and accepted at the start of the project provided the asphalt concrete mixture continues to conform to the provisions of this Section 11-1, "Quality Control / Quality Assurance."

The Contractor shall submit a mix design letter that indicates the target values proposed for gradation, asphalt content, and percent air voids. This submittal shall include test results for aggregate and asphalt mixture quality; plots of the combined gradings showing the production tolerances; plots of unit weight, stability, and percent air voids versus asphalt content for the asphalt contents considered in the design process. In addition, this submittal shall include test results for stability, percent air voids, and swell for 3 briquettes constructed using the submitted aggregate and asphalt blended at the proposed target values for each asphalt concrete mixture to be used.

The Contractor shall submit the following for each asphalt concrete mixture proposed:

A. Aggregate and mineral filler:

1. Target values for percent passing each sieve size for the aggregate blend;
2. Results of tests for aggregate quality requirements;
3. Source of each aggregate to be used including producer, location, and California Mine Identification number;
4. Percentage of each aggregate stockpile, cold feed or hot bin to be used;
5. Gradation of each aggregate stockpile, cold feed or hot bin to be used; and
6. Samples that are representative of the aggregate to be used. Minimum sample sizes shall be as follows:

133 pounds of each coarse aggregate;
88 pounds of each fine aggregate; and
11 pounds of each supplemental fine aggregate.

B. Asphalt binder:

1. Asphalt binder source and target value;
2. Four one-quart samples of the asphalt binder;
3. Results of the asphalt binder quality tests conforming to the provisions in Section 92, "Asphalts," of the Standard Specifications; and
4. Material Safety Data Sheets.

C. Antistrip additives, when applicable:

1. An 11 pound sample of the dry additive or a one-quart sample of the liquid antistrip additive, including name of product, manufacturer, manufacturer's designation and proposed rate, location, and method of addition; and
2. Material Safety Data Sheets.

The proposed asphalt concrete mix design submittal will be considered complete only when the mix design letter, test results, plots, and samples have been received by the Engineer.

39-3.02 ENGINEER REVIEW OF ASPHALT CONCRETE MIX DESIGN

The Engineer will review the proposed aggregate and asphalt concrete mixture for conformance with this Section 11-1, "Quality Control / Quality Assurance." The proposed asphalt concrete mixture will be reviewed at the proposed target values for aggregate grading and asphalt content. The Engineer will have 14 days to review each submittal of a proposed mix

design. Production of asphalt concrete shall not begin until written notification has been received from the Engineer that the aggregates and proposed mix design meet the quality requirements of this Section 11-1.

The Engineer will reject a proposed asphalt concrete mixture that, during review, fails to meet the quality requirements of Table 39-2, "Aggregate Quality Requirements," and Table 39-3, "Asphalt Concrete Mixture Requirements," of this Section 11-1. The Contractor shall resubmit a mix design letter providing new test results, plots, and material samples.

Disagreements in mix design review shall be resolved in conformance with Section 39-6, "Dispute Resolution," of this Section 11-1. The Contractor shall use a mix design on the project only after the Engineer concurs that the aggregate and asphalt concrete represented by the proposed mix design conforms to the provisions of this Section 11-1.

The Engineer will review one proposed asphalt concrete mix design for each asphalt concrete type and aggregate size from each plant proposed for use on this project at the State's expense. Costs for additional reviews due to failure to conform to the quality requirements of this Section 11-1 and for reviewing other proposed asphalt concrete mix designs will be deducted from moneys due or to become due the Contractor. The cost for each review will be \$1,500. Costs for reviewing changes in a mix design that are initiated by the Engineer will be waived. Contractor's retesting due to errors in the Engineer's testing will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Costs for reviewing mix designs not used in this project will be deducted from moneys due or to become due the Contractor.

39-4 CONTRACTOR QUALITY CONTROL

39-4.01 GENERAL

The Contractor shall be responsible for the quality of the asphalt concrete entering into the work and of the work performed. In addition, the Contractor shall be responsible for the quality of asphalt concrete or ingredients procured from subcontractors or vendors. A quality control system shall be established, maintained, and modified, if needed, that will provide assurance that materials and completed work conform to contract requirements.

At least 14 days prior to the start of production of asphalt concrete, the Contractor shall submit a written Quality Control Plan. At the request of the Engineer or the Contractor, the Contractor shall discuss the Quality Control Plan with the Engineer.

39-4.02 QUALITY CONTROL PLAN

The Quality Control Plan shall describe the organization and procedures that will be used to administer the quality control system including the procedures used to control the production process, the procedures used to determine when changes to the production process are needed, and the procedures proposed to be used to implement the required changes. The Quality Control Plan shall meet the minimum standards set forth in the Department's "Manual for Quality Control and Quality Assurance for Asphalt Concrete," available as specified in "Asphalt Concrete" in Section 10-1, "General," of these special provisions.

Asphalt concrete production and placement shall not begin until the Quality Control Plan has been approved by the Engineer. Approval of the Quality Control Plan does not imply a warranty by the Engineer that adherence to the plan will result in production of asphalt concrete that complies with this Section 11-1. It shall remain the responsibility of the Contractor to demonstrate such compliance.

The Quality Control Plan shall include the name and qualifications of a Quality Control Manager. The Quality Control Manager shall be responsible for the administration of the Quality Control Plan, including compliance with the plan and plan modifications. The Quality Control Manager shall be responsible to the Contractor, shall have the authority to make decisions concerning quality of the work or product, and shall be available to the project within less than 3 hours during paving. Except in cases of emergency and with the approval of the Engineer, the Quality Control Manager cannot be a foreman, member of the production or paving crew, an inspector or tester on this project during pavement production and placement.

The Quality Control Plan shall identify personnel, equipment and documentation required for a complete inspection, sampling and testing program. The Quality Control Plan shall include, but not be limited to, a list of inspectors, samplers and testers, their duties, their certifications if required, and their experience if no certification is required. It shall also list the name and location of laboratories that shall be providing information to the Engineer, the testers who conducted the tests and their certifications and the name of the Laboratory Quality Control Manager responsible for oversight of the testing program. It shall also show examples of the test result forms (if different from those in the Department's "Manual for Quality Control and Quality Assurance for Asphalt Concrete"), the roadway and plant inspection forms, the Quality Control Manager's daily summary form, and the compliance charts. It shall include the method by which random sampling shall be determined, a list of the testing and sampling equipment to be used and the current calibration dates and calibration charts, and copies of nuclear gauge licenses.

The Quality Control Plan shall include the name and certification of a testing consultant to be an Independent Third Party in dispute resolution. By mutual agreement during dispute resolution, the Independent Third Party may be a District Independent Assurance Sampler and Tester, the testing consultant or both. The proficiency of the testing consultant shall be reviewed and certified in conformance with the requirements of the Department's Quality Assurance Program before the test consultant participates in dispute resolution. Attention is directed to Section 39-6, "Dispute Resolution," of this Section 11-1.

The Quality Control Plan may be modified as work progresses. A supplement shall be submitted whenever there are changes to quality control procedures or personnel. Asphalt concrete production and placement shall not resume or continue until revisions to the Quality Control Plan or quality control personnel have been approved by the Engineer.

39-4.03 CONTRACTOR QUALITY CONTROL INSPECTION, SAMPLING, AND TESTING

The Contractor shall perform process and quality control sampling and testing, provide inspection, and exercise management control to ensure that asphalt concrete production and placement conforms to the provisions of this Section 11-1. Staffing for process and quality control shall meet the minimum requirements outlined in the Department's "Manual for Quality Control and Quality Assurance for Asphalt Concrete."

Process and quality control, sampling, testing, and inspection shall be provided during the asphalt concrete work. Sampling, testing, and inspection shall be performed at a rate sufficient to ensure that asphalt concrete conforms to the provisions of this Section 11-1.

A roadway inspector shall be provided while asphalt concrete paving operations are in progress. The roadway inspector shall ensure that asphalt concrete placement conforms to industry standards and to the spreading, compacting, and finishing requirements of this Section 11-1, "Quality Control / Quality Assurance." Plant inspection shall be performed as necessary to maintain control of the asphalt concrete production.

Minimum sampling and testing requirements for process and quality control are specified in Table 39-4, "Minimum Process Control Requirements," and Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1. Sampling shall be statistically based and random.

During production start-up evaluation, the Contractor shall sample and test in conformance with the provisions in Section 39-10.02A, "Production Start-Up Evaluation," of this Section 11-1.

A testing laboratory and personnel shall be provided for the performance of process and quality control testing. The Engineer shall have unrestricted access to mix design, sampling, and testing.

The proficiency of testing laboratories and sampling and testing personnel shall be reviewed, qualified, and certified by the Department's Independent Assurance Sampler and Tester before providing services to the project. Inspectors shall meet the standards set forth in the Department's "Manual for Quality Control and Quality Assurance for Asphalt Concrete."

39-4.04 CONTRACTOR PROCESS CONTROL

Process control sampling and testing shall be performed and control shall be exercised to ensure that asphalt concrete production conforms with this Section 11-1.

Minimum process control sampling and testing shall be performed in compliance with the following:

Table 39-4 - MINIMUM PROCESS CONTROL REQUIREMENTS

Quality Characteristic	Action Limit	California Test	Minimum Sampling and Testing Frequency	Point of Sampling ‡	Reporting Time Allowance
Sand Equivalent (Min)	47 (Type A) 42 (Type B)	217	One sample per 2756 tons	Batch plant - from hot bins. Drum plant - from cold feed.	24 hours
		(Reported value shall be the average of 3) ¹	Not less than one sample per 2 days		
Stability	37 (Type A) 35 (Type B)	366 ²	See Note 4	Mat behind paver	48 hours
		(Reported value shall be the average of 3) ^{1,3,5}	Not less than one sample per 5 days		

Notes:

‡ In conformance with the requirements of California Test 125.

1. Samples used for the 3 tests to be averaged shall be from a single split sample.
2. Reheat for sample preparation shall be 2 hours maximum.
Do not place sample or briquette in oven for 15-hour cure.
3. Briquettes shall be fabricated from a single, combined sample obtained from at least 4 locations across the mat behind the paver in conformance with the requirements of California Test 125.
If the range of stability for the three briquettes is more than 12 points, the samples shall be discarded and new samples shall be obtained before the end of the following shift of paving and tested in conformance with the requirements of Table 39-3, "Asphalt Concrete Mixture Requirements."
4. Asphalt concrete will be sampled and tested each of the first 5 days of production and may be decreased to one for each 5 days thereafter unless stability falls below the action limit.
When stability falls below the action limit, sampling will be increased to one sample for each of the first 5 days of production and may be decreased to one for each 5 days thereafter.
The sequence of the first 5 test results shall not be broken by more than 7 days of suspended operations.
5. During production start-up evaluation, a correlation factor for cured vs. uncured specimens shall be established in conformance with the requirements of Section 39-10.02A, "Production Start-Up Evaluation."

The process control test results shall be plotted on specification compliance charts indicating the action limits for the quality characteristic. When one test result falls below the action limit for an individual measurement, the Contractor shall notify the Engineer, take corrective action, and sample and test within the next 551 tons of production. When 2 consecutive test results for an individual characteristic fall below the action limit, the asphalt concrete represented by the 2 tests shall be considered not in compliance. When 2 consecutive test results for an individual characteristic fall below the action limit, the Contractor shall suspend production, notify the Engineer, and take corrective action. With the approval of the Engineer, up to 1102 tons of asphalt concrete may be placed to demonstrate that the asphalt concrete is once again in compliance with the provisions of this Section 11-1. Production shall begin only after the Engineer has received test results confirming compliance.

Asphalt concrete that has 2 consecutive stability test results less than or equal to 26 for Type A asphalt concrete or less than or equal to 24 for Type B asphalt concrete shall be removed at the Contractor's expense. Asphalt concrete placed to demonstrate compliance that does not meet the provisions of this Section 11-1 shall be removed at the Contractor's expense.

39-4.05 CONTRACTOR QUALITY CONTROL

Quality control, sampling, testing, and inspection shall be provided during asphalt concrete work. Sampling, testing, and inspection shall be performed at a rate sufficient to ensure that the asphalt concrete product conforms to the requirements in this Section 11-1. Sampling for testing to be reported to the Engineer shall be performed at the minimum frequency specified in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1, "Quality Control / Quality Assurance."

Quality control samples of aggregates and asphalt concrete mixture shall be obtained and split. One split portion of each sample shall be used for quality control testing and the other portion shall be reserved for possible retest during dispute resolution, in conformance with Section 39-6, "Dispute Resolution," of this Section 11-1. Quality control samples shall be stored in a location listed in the Quality Control Plan until disposal has been approved by the Engineer.

The Contractor shall obtain a one-quart sample of the asphalt binder in conformance with Section 39-7.01C, "Asphalt Binder Storage," of this Section 11-1 for each day of asphalt concrete production. The sample containers shall be labeled as shown in the "Manual for Quality Control and Quality Assurance for Asphalt Concrete" and shall be sent by the Contractor to the Transportation Laboratory on a weekly basis, except for modified asphalts that shall be shipped daily. A copy of the transmittal form shall be attached to the daily report of inspection.

When test results for a single quality characteristic deviate beyond the limits specified in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1 the Contractor shall take corrective action and shall bring the asphalt concrete within the specification limits. The corrective action taken shall be documented in the records of inspection in conformance with Section 39-4.06B, "Records of Inspection and Testing," of this Section 11-1. When a single quality characteristic deviates 3 consecutive times beyond the limits specified in Table 39-9, "Minimum Quality Control Test Requirements," of this Section 11-1, the Contractor shall suspend production, shall notify the Engineer, and shall take corrective action. With the approval of the Engineer, up to 1102 tons of asphalt concrete may be placed and the requirements of Section 39-10.02A, "Production Start-Up Evaluation," of this Section 11-1 shall be used to demonstrate that the asphalt concrete is once again in compliance with this Section 11-1. Production of asphalt concrete shall start only after the Engineer has received test results confirming compliance. When an individual quality characteristic deviates 3 consecutive times beyond the specification limits and production of asphalt concrete has been suspended, the lot shall be terminated.

If an ignition oven is used for asphalt content in conformance with the requirements of California Test 382, gradations of the remaining aggregates shall be provided for each 5512 tons of production. Testing of the aggregates shall be in conformance with the requirements of California Test 202, Sections F and G, "Sieve Analysis of Fine and Coarse Aggregates." Test results from these gradings shall be provided prior to completion of the project. Gradings from the aggregates recovered from the ignition oven will not be used in the statistical analysis for quality or for pay. Payment for these gradings will be made as extra work as provided in Section 4-1.03D of the Standard Specifications at the rate of \$150 per test result for the cost of the additional testing.

39-4.06 CHARTS AND RECORDS

The Contractor shall record sampling and testing results for both process control and for quality control on forms as provided in the Department's "Manual for Quality Control and Quality Assurance for Asphalt Concrete" or on forms approved by the Engineer. Complete testing records shall be maintained and posted in the Contractor's laboratory. Models of forms that are different from those in the Department's "Manual for Quality Control and Quality Assurance for Asphalt Concrete," locations of postings, and times and means of submissions shall be provided in the Quality Control Plan.

For every 5512 tons of asphalt concrete produced, the Contractor shall provide an electronic copy of the process and quality control test results using the Department's statistical evaluation program "ACPay" available as specified in "Asphalt Concrete" in Section 10-1, "General," of these special provisions.

Compliance charts and inspection and testing records, except stability test results used for process control, shall be submitted within 24 hours after completion of that shift of asphalt concrete production. If the record is incomplete or in error, a copy of the record will be returned with the deficiencies noted by the Engineer. The Contractor shall correct deficiencies and return the updated record by the start of the following working day. When errors or omissions in the inspection or testing records repeatedly occur, asphalt concrete production and placement shall be suspended and the procedures by which the records are produced shall be corrected before production and placement will be restarted.

39-4.06A Compliance Charts

The Contractor shall develop and maintain time linear specification compliance charts. The compliance charts shall identify the project, test number, test parameter, applicable upper and lower specification limits, and test results.

Compliance charts shall be kept current and shall be posted at a location designated in the Quality Control Plan. Compliance charts shall be updated each day of asphalt concrete production, and up-to-date copies shall be included in the submittals to the Engineer of each day's test results.

39-4.06B Records of Inspection and Testing

For each day of asphalt concrete production, the Contractor shall prepare an "Asphalt Concrete Construction Daily Record of Inspection," on forms provided in the Department's "Manual for Quality Control and Quality Assurance for Asphalt Concrete." A form shall be submitted for inspection at the plant and at the roadway.

For each day of asphalt concrete production, the Contractor shall prepare an "Asphalt Concrete Inspection and Testing Summary" on a form provided in the Department's "Manual for Quality Control and Quality Assurance for Asphalt Concrete." Plant and roadway inspection forms documenting the day's plant production and roadway placement shall be completed. Deviations from the specifications or the Contractor's regular practice shall be listed and explained. Individual inspection forms shall be signed by the inspector and initialed by the Quality Control Manager and attached to the summary at submittal. Test forms documenting test results shall be complete, signed by the tester, checked and initialed by the Quality

Control Manager, and attached to the summary at submittal. Sampling and testing data and calculations that support a test result shall be made available to the Engineer within 48 hours when requested.

The "Asphalt Concrete Inspection and Testing Summary" shall include the following certification signed by the Quality Control Manager:

It is hereby certified that the information contained in this record is accurate, and that information, tests or calculations documented herein comply with the requirements of the contract and the standards set forth in the testing procedures. Exceptions to this certification are documented as a part of this record.

39-5 ENGINEER QUALITY ASSURANCE

39-5.01 GENERAL

The Engineer will assure conformance to contract specifications by review of the Contractor's mix design proposal, by inspection of the Contractor's procedures, by oversight of the Contractor's quality control inspection and records, by splitting and testing samples with the Contractor during evaluation of the plant production start-up and the nuclear density test strip, and by independent verification sampling and testing of the asphalt concrete and aggregates during asphalt concrete production.

The Contractor may witness assurance sampling and testing. However, the Engineer will not be required to notify the Contractor of anticipated sampling schedules or locations and will not delay sampling or testing if the Contractor is unable to attend. The Contractor shall not use samples taken for assurance testing for testing and submittal as a quality control test result.

The Engineer will provide the Contractor with copies of the assurance test results not more than 2 working days after receipt of the results. Sampling and testing data and calculations that support a test result shall be made available to the Contractor within 48 hours when requested.

The Engineer may test the asphalt, aggregates or asphalt concrete mixture to determine conformance with this Section 11-1, "Quality Control / Quality Assurance," whenever an asphalt concrete mixture or ingredient appears defective or inconsistent or whenever a test result indicates a change in the characteristics of the asphalt concrete mixture or an ingredient. Asphalt, aggregates or asphalt concrete that does not conform with this Section 11-1 will be rejected in conformance with Section 39-11, "Acceptance of Work," of this Section 11-1.

The Contractor, when directed by the Engineer, shall obtain representative samples of the asphalt concrete mixture or ingredients that appear defective or inconsistent. The samples shall be split into 4 portions. The Contractor shall retain 1 portion for testing if the Contractor chooses and 3 portions shall be delivered to the Engineer. The asphalt concrete or ingredient need not be sampled if the Contractor elects to remove and replace the asphalt concrete, at the Contractor's expense, or if the Contractor uses a method of correcting the situation that has been approved by the Engineer. Test results from these additional samples shall not be used as a basis for a calculated pay factor.

39-5.02 SAMPLING AND TESTING FOR VERIFICATION

Independent of the Contractor's quality control testing, the Engineer will obtain random samples of the aggregate and asphalt concrete mixture and test for in-place density.

Samples of aggregates and asphalt concrete will be obtained during asphalt concrete production and placement, and will be split into at least 4 portions. One of the split portions will be tested by the Engineer and used to verify quality control test results, one portion will be provided to the Contractor, and 2 portions will be reserved and stored for testing in conformance with the provisions in Section 39-6, "Dispute Resolution," of this Section 11-1. When verifying the relative compaction, the Engineer will obtain a sample of a sample of asphalt concrete from the mat behind the paver, will split the sample and apportion the sample as described above, and will test the sample for test maximum density.

The Engineer will test for material quality characteristics specified in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1. Verification tests will be at a frequency of not less than 10 percent of the minimum quality control sampling and testing frequency and will be performed in conformance with the test methods specified in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1. Verification tests will be performed using the same test methods used for quality control testing.

During the Engineer's verification of the relative compaction, the Engineer will determine the location of 551 tons of asphalt concrete to be tested using a random number, will obtain an asphalt concrete sample from within this location for determination of the test maximum density, and will determine the relative compaction of the in-place asphalt concrete as specified in California Test 375. The Contractor shall obtain one of the split samples of asphalt concrete for determination of test maximum density and shall determine the relative compaction of the 551 tons of asphalt tested by the Engineer using the same testing sites determined by the Engineer. The results of this common testing will be compared to the allowable testing difference defined in Table 39-6, "Allowable Testing Differences," of this Section 11-1. If the test maximum density or the relative compaction does not comply with the allowable testing difference, then the Engineer and Contractor will use

the first 551 tons of the next day's production to re-correlate the nuclear gauges used in testing as defined by California Test 375.

During production start-up evaluation, the Engineer will witness the sampling of asphalt concrete and aggregates and will perform tests on the materials in conformance with Section 39-10.02A, "Production Start-Up Evaluation," of this Section 11-1.

39-5.03 VERIFICATION

The Engineer will determine the acceptability of the quality control test results by using the *t*-test for sample means to test whether or not the means of the quality control test results and verification test results are within an allowable testing difference. Quality control test results and verification test results for each indexed quality characteristic will be used in the verification process.

The *t*-value of the group of test data to be verified is computed as follows:

$$t = \frac{|\bar{X}_c - \bar{X}_v|}{S_p \sqrt{\frac{1}{n_c} + \frac{1}{n_v}}} \quad \text{and} \quad S_p^2 = \frac{S_c^2(n_c - 1) + S_v^2(n_v - 1)}{n_c + n_v - 2}$$

where:

- n_c = Number of Contractor's quality control tests (minimum of 2 required)
- n_v = Number of Verification tests (minimum of 1 required)
- \bar{X}_c = Mean of the Contractor's quality control tests
- \bar{X}_v = Mean of the Verification tests
- S_p = Pooled standard deviation
(When $n_v = 1$, $S_p = S_c$)
- S_c = Standard deviation of the Contractor's quality control tests
- S_v = Standard deviation of the Verification tests (when $n_v > 1$)

The comparison of quality control test results and verification test results will be considered at a level of significance,

_____ Computing the equation above and compare to the critical *t*-value, t_{crit} , from the following table:

Table 39-5 - CRITICAL *t*-VALUE FOR VERIFICATION OF QUALITY CONTROL TESTING

degrees of freedom ($n_c + n_v - 2$)	t_{crit} (for $\alpha = 0.01$)	degrees of freedom ($n_c + n_v - 2$)	t_{crit} (for $\alpha = 0.01$)
1	63.657	18	2.878
2	9.925	19	2.861
3	5.841	20	2.845
4	4.604	21	2.831
5	4.032	22	2.819
6	3.707	23	2.807
7	3.499	24	2.797
8	3.355	25	2.787
9	3.250	26	2.779
10	3.169	27	2.771
11	3.106	28	2.763
12	3.055	29	2.756
13	3.012	30	2.750
14	2.977	40	2.704
15	2.947	60	2.660
16	2.921	120	2.617
17	2.898		2.576

Quality control test results are verified if the t -value computed is less than or equal to t_{crit} ($t \leq t_{crit}$), and the difference between the means of the quality control test results and verification test results are within an allowable testing difference. Quality control test results are not verified if the t -value computed is greater than t_{crit} ($t > t_{crit}$), and the difference between the means exceeds the allowable testing difference. The allowable testing difference shall be as follows:

Table 39-6 - ALLOWABLE TESTING DIFFERENCE

Quality	California Test	Allowable Testing Difference
Sand Equivalent (min.)	217	8
Hveem Stabilometer Value (min.)	366	10
Percent Air Voids	367	1.5
Asphalt Content	379 or 382	0.3%
Gradation	202	
3/4" or 1/2"		2
3/8"		4
No. 4		3
No. 8		2
No. 30		2
No. 200		1.0
Relative Compaction	375	0.8%
Test Maximum Density		0.03 g/cc

If quality control test results are not verified, the Contractor will be notified of the difference. The Engineer will sample asphalt concrete production at a more frequent interval. Resolution of the problem shall be in conformance with the provisions in Section 39-6, "Dispute Resolution," of this Section 11-1.

39-6 DISPUTE RESOLUTION

39-6.01 GENERAL

The Contractor and the Engineer shall work together to avoid potential conflicts and to resolve differences that may arise from a disagreement regarding test result comparisons.

Should the results of the testing fail to meet the criteria of the stage at which the disagreement arose, production shall be suspended. Production shall not start or resume nor shall asphalt concrete be accepted until the differences have been resolved and the Engineer is assured that the asphalt concrete conforms to this Section 11-1, "Quality Control / Quality Assurance."

When the Engineer and the Contractor, together or separately, are unable to determine the source of error, an Independent Third Party shall act as witness and referee.

In disagreements, if the Engineer's testing process meets the requirements of this Section 11-1, costs related to the review shall be borne by the Contractor. The Contractor's sampling and testing program shall be modified as necessary. New test results shall be submitted to the Engineer. Test results judged to be in error shall be removed from consideration and the new test results shall be substituted. If split samples are not available and retesting is not possible, that portion of the asphalt concrete produced or placed prior to and during the disagreement will be evaluated based on the results of the Engineer's verification test results.

In disagreements, if the Engineer's testing process fails to meet the requirements of this Section 11-1, costs related to the review shall be borne by the State. The Engineer's sampling and testing program will be modified as necessary. Test results judged to be in error shall be removed from consideration and the new test results shall be substituted. Contractor's retesting due to errors in the Engineer's testing will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. If, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of delays or errors in the Engineer's testing, the delay will be considered a right of way delay as provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

In disagreements, if both the Contractor's and the Engineer's testing processes have failed to meet the requirements of this Section 11-1 or if the cause cannot be determined, each party will bear the costs related to their own review. When appropriate, the Contractor's and the Engineer's sampling and testing programs shall be modified as necessary, split samples of the Contractor's quality control samples or the Engineer's verification samples shall be retested, and the new quality control test results shall be submitted to the Engineer. Test results judged to be in error shall be removed from consideration and the new test results shall be substituted. If split samples of aggregates or asphalt concrete mixture from the Contractor's

testing are not available where retesting is required, that portion of the asphalt concrete produced prior to and during the disagreement will be evaluated based on the results of the Engineer's verification test results.

39-6.02 DURING THE ASPHALT CONCRETE MIX DESIGN REVIEW

During the asphalt concrete mix design review, if the Engineer's review does not confirm that one or more of the aggregate or the asphalt concrete mixture qualities comply with this Section 11-1, "Quality Control / Quality Assurance," both parties will review their sampling, testing, and test results and shall share their findings. Testers and laboratories shall be made available for witnessing. Calculations and test results shall be made available for review. If an error in the Contractor's testing is detected during this review, the Contractor shall, as is appropriate, recalculate or retest. The new test results shall be submitted to the Engineer. If an error in the Engineer's testing is detected, the Engineer will, as is appropriate, recalculate or retest.

If the Contractor's and Engineer's review does not reveal the source of conflict, the Contractor's and the Engineer's sampling and testing processes shall be witnessed by the Independent Third Party. Testing to resolve the dispute in results for the mix design shall be performed using samples that were obtained and split while being witnessed by the Independent Third Party. Review of sample preparation and testing will be performed at both the Contractor's and the Engineer's laboratory on a portion of the split material while being witnessed by the Independent Third Party. The resulting mix design shall be used for production.

39-6.03 DURING THE PRODUCTION START-UP EVALUATION

When the Contractor's and Engineer's test results during production start-up fail to meet the provisions in Section 39-10.02, "Production Start-Up Evaluation and Nuclear Density Test Strips," both parties will review their sampling, testing, and test results, and shall share their findings. Testers and laboratories shall be made available for witnessing. Calculations and test results shall be made available for review. If an error in the Contractor's testing is detected during this review, the Contractor shall, as is appropriate, recalculate or retest. The new test results shall be submitted to the Engineer. If an error in the Engineer's testing is detected, the Engineer will, as is appropriate, recalculate or retest.

If the Contractor's and the Engineer's review does not resolve the differences, the Contractor's and the Engineer's testing processes shall be witnessed by the Independent Third Party using the 2 remaining portions of the split samples. If necessary, a 276-ton to 551-ton quantity of asphalt concrete shall be placed at a location agreed to by the Engineer to provide asphalt concrete and ingredients for sampling and testing for the Independent Third Party review.

If an error in the Contractor's testing is detected by the Independent Third Party, the Contractor shall take corrective action and, as appropriate, recalculate or retest the split portion of the trial quantity of asphalt concrete in question. The new test results shall be submitted to the Engineer. If an error in the Engineer's testing is detected by the Independent Third Party, the Engineer will take corrective action and, as appropriate, recalculate or retest the split portion of the first trial quantity.

Production shall not start nor shall asphalt concrete be accepted until the differences have been resolved and the test results meet the provisions in Section 39-10.02, "Production Start-Up Evaluation and Nuclear Density Test Strips," of this Section 11-1.

39-6.04 DURING PRODUCTION

When it is determined that the quality control test results could not be verified, both parties will review their sampling, testing, and test results, and shall share their findings. Testers and laboratories will be made available for witnessing. Calculations and results will be made available for review.

If an error in the quality control sampling or testing is detected during the Contractor's or the Engineer's review, the Contractor shall either recalculate or, if appropriate, retest using the reserved split portions of the quality control samples. These new test results shall be submitted to the Engineer. If an error in the verification sampling or testing is detected, the Engineer will recalculate or, if appropriate, retest using a reserved split portion of the verification samples. Using the new test results, the Engineer will repeat the calculation of the *t*-test and will determine if the means of the quality control tests and the verification test results are within the allowable testing difference as specified in Section 39-5.03, "Verification," of this Section 11-1.

When the verification test results do not verify the quality control test results 3 consecutive times, both the Contractor's and the Engineer's testers shall be witnessed by the Independent Third Party while sampling, splitting, and testing samples from the production unit or from the mat. The Contractor may produce and place up to 1102 tons of asphalt concrete to provide materials and sampling opportunities. Production and placement of asphalt concrete will be suspended until the Independent Third Party has completed the review of the Contractor's and the Engineer's sampling and testing and resolved the differences.

If an error in the Contractor's testing is detected by the Independent Third Party, the Contractor shall take corrective action and, as appropriate, recalculate or retest the split portion of the quality control samples. The new test results shall be submitted to the Engineer. If an error in the Engineer's testing is detected by the Independent Third Party, the Engineer will

take corrective action and, as appropriate, recalculate or retest a split portion of the verification samples. When the error has been detected and corrected, production shall resume and the services of the Independent Third Party will be discontinued.

If a problem is not identified during the Independent Third Party review, the Independent Third Party shall be retained for the duration of the project or until a problem has been identified. Until all asphalt concrete has been produced and placed, the Contractor shall sample and split quality control samples in the presence of the Independent Third Party. One portion of each sample shall be tested by the Contractor in conformance with the intervals specified in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1, and the other portion shall be delivered to the Engineer by the Independent Third Party. The Engineer will test at least one of every 5 of the split samples for verification purposes. A new lot will be designated for asphalt concrete produced since the Independent Third Party was consulted. The pay factor for this lot will be determined in conformance with Section 39-11.02, "Statistical Evaluation and Determination of Pay Factor," of this Section 11-1 with the exception that both the Contractor's quality control test results and the Engineer's verification test results will be combined and will be the basis for acceptance of that portion of the work. The pay factor for the lot of asphalt concrete which brought about the dispute resolution shall be determined in conformance with Section 39-11.02, "Statistical Evaluation and Determination of Pay Factor," of this Section 11-1 with the exception that both the Contractor's quality control test results and the Engineer's verification test results will be combined and will be the basis for acceptance of that portion of the work.

39-7 STORING, PROPORTIONING AND MIXING MATERIALS

39-7.01 STORAGE

The Contractor shall store the aggregate for asphalt concrete so that separately sized aggregates will not be intermingled and shall store asphalt binder so that different grades of asphalt will not be intermingled. Aggregate that has been intermingled with aggregate of another size shall be removed by the Contractor and replaced with aggregate of specified grading.

When the Contractor adds supplemental fine aggregate, each supplemental fine aggregate used shall be stored separately and kept thoroughly dry.

The measurement and storage provisions of this Section shall not apply to the dust collected in skimmers and expansion chambers (knock-out boxes) or to the dust collected in centrifugal (cyclone) collectors. Dust from these collectors may be returned to the aggregate without being measured or stored separately, provided the dust is returned uniformly at a point in advance of the sampling device in batch-mixing plants or is returned at or before mixing in continuous mixing plants.

Aggregate and asphalt binder shall be stored in conformance with the following requirements.

39-7.01A Aggregate Cold Storage

Material shall be fed from storage with a mechanical feeder. Before being fed to the drier, aggregate shall be separated into 3 or more sizes and stored separately.

39-7.01B Aggregate Hot Storage

Aggregate for asphalt concrete to be mixed in batch mixing plants shall be stored, after being dried, in conformance with the following requirements:

1. Aggregates for asphalt concrete shall be separated into 3 or more sizes.
2. After the aggregate is separated, each size shall be stored in a separate bin, and shall be recombined in conformance with the provisions in Section 39-7.03A, "Proportioning for Batch Mixing," of this Section 11-1 in order to conform to the gradings specified in Section 39-2, "Materials," of this Section 11-1. Storage bins shall be provided with chutes to prevent overflow into adjacent bins.

39-7.01C Asphalt Binder Storage

Asphalt to be used as a binder for asphalt concrete shall be stored in heated tanks.

A suitable sampling device shall be provided in asphalt feed lines connecting plant storage tanks to the asphalt weighing system or spray bar. The sampling device shall consist of a valve with a nominal diameter between 1/2-inch and 3/4-inch, constructed in such a manner that a one-liter sample may be slowly withdrawn during plant operations. The valve shall be maintained in good condition and, if the valve fails to function properly, the valve shall be replaced. The sampling device shall be readily accessible and in an area free of dangerous obstructions and shall be between 24 inches and 30 inches above the platform. A drainage receptacle shall be provided for flushing the device prior to sampling.

The discharge end of the asphalt binder circulating pipe shall be maintained below the surface of the asphalt binder in the storage tank to prevent discharging hot asphalt binder into open air.

A temperature sensing device shall be installed in the asphalt feed line. The device shall measure the temperature of the asphalt and shall be accurate to 10°F increments. An automatic, continuous recording device shall be provided and used to maintain accurate records of the asphalt temperature during production. Where the plant controller has the capability of capturing production data electronically, including ingredient temperatures, and when this data represents the temperature at the time of production and is captured at intervals of not greater than 5 minutes, this process will be considered to be continuous recording. Captured data shall be retained for the duration of the contract and shall be submitted to the Engineer on request.

39-7.02 DRYING

Aggregate shall be fed directly to a drier-drum mixer or to a drier at a uniform rate.

Aggregate shall be dried such that, at the time of spreading, the moisture content of the completed asphalt concrete mixture shall not exceed 1.0 percent and the minimum and maximum asphalt concrete mixture temperatures are not exceeded. Moisture content will be determined in conformity with the requirements of California Test 370.

The drier or drier-drum mixer shall be provided with a device that senses the temperature of the material leaving the drier or the drier-drum mixer. The temperature-sensing device shall be accurate to the nearest 10°F. The indicator shall be located and maintained at the point where the proportioning operations are controlled. An automatic continuous recording device shall be provided and used to maintain accurate records of the temperatures during production. Where the plant controller has the capability of capturing production data electronically, including ingredient temperatures, and when this data represents the temperature at the time of production and is captured at intervals of not greater than 5 minutes, this process will be considered to be continuous recording. Captured data shall be retained for the duration of the contract and shall be submitted to the Engineer on request.

The burner used for heating the aggregate shall achieve complete combustion of the fuel.

39-7.03 PROPORTIONING

Proportioning shall be either by hot-feed control or cold-feed control. Hot-feed control and cold-feed control indicate the location of the measuring devices or controls.

The Contractor's mixing equipment shall be equipped with a suitable, safe sampling device that will provide a sample, representative of actual production, of the aggregate being incorporated into the asphalt concrete. The delivery point of samples shall be safe and convenient. When samples are taken from a location above ground level, a means shall be provided for lowering the aggregate samples to the ground.

39-7.03A Proportioning for Batch Mixing

When the Contractor elects to use batch mixing equipment, each aggregate hot storage bin shall be equipped with a sampling device that will provide a sample of the aggregate discharged into the weigh hopper.

Fine material collected in dust control systems, other than centrifugal collectors or knock-out boxes, shall be considered to be supplemental fine aggregate. When supplemental fine aggregate is used, it shall be proportioned by weight.

A sampling device for supplemental fine aggregate shall be installed in each feed line or surge tank preceding the weigh hopper.

39-7.03A(1) Batching Tolerances

Aggregate and asphalt shall be proportioned by weight as follows:

- A. The zero tolerance for aggregate scales shall be 0.5-percent of the total batch weight of the aggregate. The zero tolerance for separate scales for weighing supplemental fine aggregate or asphalt binder shall be 0.05-percent of the total batch weight of the aggregate.
- B. Unless otherwise approved by the Engineer, the indicated weight of material drawn from storage shall not vary from the preselected scale setting as defined by target values of the approved mix design by more than the following percentages of the total batch weight of the aggregate:
 - 1. Aggregate shall be within one percent, except that when supplemental fine aggregate is used and is weighed cumulatively with the aggregate, the draft of aggregate drawn immediately before the supplemental fine aggregate shall be within 0.5-percent.
 - 2. Supplemental fine aggregate shall be within 0.5-percent.
 - 3. Asphalt binder shall be within 0.1-percent.

The asphalt binder shall be measured by a tank scale.

39-7.03A(2) Automatic Controls

Batch proportioning shall be by an automatic plant controller. The proportioning devices shall be automatic to the extent that the only manual operation required for proportioning materials for one batch shall be a single operation of a switch or starter.

Proportioning devices shall be of a type in which materials discharged from the several bins are controlled by gates or by mechanical conveyors. The batching devices shall be so interlocked that no new batch may be started until weigh hoppers are empty, the scales are at zero, and the discharge gates are closed. The means of withdrawal from the bins and of discharge from the weigh box shall be interlocked so that not more than one bin can discharge onto a given scale at one time, and so that the weigh box cannot be tripped until the required quantity from each of the bins has been deposited therein. In addition, automatic proportioning devices shall be interlocked so that the weighing cycle will be interrupted whenever the amount of material drawn from storage varies from the pre-selected amount by more than the tolerances specified in this Section 11-1. Whenever the weighing cycle is interrupted, that specific batch shall not be used in the work unless it can be manually adjusted to meet the specified tolerances based on the total weight of the batch. When partial batches are batched, the interlock tolerances, except the zero tolerance, shall apply to the total weight of aggregate in the partial batch.

Proportioning devices shall be operated so that all weight increments required for a batch are preset at the same time. Controls shall be designed so that these settings may be changed without delay and the order of discharge from the several bins can be changed.

Proportioning controls shall be equipped with the means for inspection of the interlock tolerance settings. Instructions for performing the inspection shall be available at the point of operation.

The necessary means shall be provided to check the weight of various proportioned amounts on a separate vehicle scale located at the plant site.

39-7.03B Proportioning for Continuous Mixing

Asphalt binder shall be introduced into the mixer through a meter conforming to the provisions in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications. The asphalt meter shall automatically compensate for changes in the asphalt temperature, unless the meter is the mass flow, coriolis effect, type. The system shall be capable of varying the rate of delivery of binder proportionate with the delivery of aggregate. During a day's run, the temperature of asphalt binder shall not vary more than 50° F. The meter and lines shall be heated and insulated. The binder storage shall be equipped with a device for automatic plant cut-off when the level of binder is lowered sufficiently to expose the pump suction line.

When supplemental fine aggregate is used, it shall be proportioned by a method that uniformly feeds the material within 2 percent of the required amount. Supplemental fine aggregate shall be discharged from the proportioning device directly into the mixer.

The supplemental fine aggregate proportioning system shall function with a degree of accuracy such that, when operated between 30 percent and 100 percent of maximum operating capacity, the average difference between the indicated weight of material delivered and the actual weight delivered shall not exceed one percent of the actual weight for three individual 15-minute runs. For the 3 individual 15-minute runs, the indicated weight of material delivered shall not vary from the actual weight delivered by more than 2 percent of the actual weight.

The fine material collected in dust control systems may be returned to the aggregate production stream without proportioning if returned at a rate commensurate with overall plant production, and if returned at or before the mixer. A return rate of less than 100 percent of the collection rate shall be metered as specified above for supplemental fine aggregate.

The asphalt feeder, each of the aggregate feeders, the supplemental fine aggregate feeder, if used, and the combined aggregate feeder shall be equipped with devices by which the rate of feed can be determined while the plant is in full operation.

The combined aggregate shall be weighed using a belt scale. The belt scale shall be of such accuracy that, when the plant is operating between 30 percent and 100 percent of belt capacity, the average difference between the indicated weight of material delivered and the actual weight delivered shall not exceed one percent of the actual weight for three individual 3-minute runs. For the 3 individual 3-minute runs, the indicated weight of material delivered shall not vary from the actual weight delivered by more than 2 percent of the actual weight.

The actual weight of material delivered for proportioning device calibrations shall be determined by a vehicle scale located at the plant site conforming to the provisions in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications. The vehicle scale shall be error checked within 24 hours of checking the plant's proportioning devices. The plant shall be equipped so that this accuracy check can be made prior to the first production operation for a project and at other times when requested by the Engineer.

The belt scale for the combined aggregate, the proportioning devices for supplemental fine aggregate, if used, and the asphalt proportioning meter shall be interlocked so that the rates of feed of the aggregates and asphalt will be adjusted automatically (at all production rates and production rate changes) to maintain the asphalt ratio (pounds of asphalt per 100 pounds of dry aggregate including supplemental fine aggregate, if used) designated in the mix design in conformance

with the provisions in Section 39-2.03, "Asphalt Concrete Mixture," of this Section 11-1. The plant shall not be operated unless this automatic system is functioning and in good working condition.

Asphalt meters and aggregate belt scales used for proportioning aggregates and asphalt shall be equipped with rate-of-flow indicators to show the rates of delivery of asphalt and aggregate. Meters and scales shall be equipped with resettable totalizers so that the total amounts of asphalt and aggregate introduced into the asphalt concrete mixture can be determined. Rate-of-flow indicators and totalizers for like materials shall be accurate within one percent when compared directly. The asphalt cement totalizer shall not register when the asphalt metering system is not delivering material to the mixer.

The bin or bins containing the fine aggregate and supplemental fine aggregate, if used, shall be equipped with vibrating units or other equipment that will prevent hang-up of material while the plant is operating. Each belt feeder shall be equipped with a device to monitor the depth of aggregate between the troughing rollers. The device for monitoring depth of aggregate shall automatically shut down the plant whenever the depth of aggregate is less than 70 percent of the target depth. To avoid erroneous shut down by normal fluctuations, a delay between sensing less than 70 percent flow and shutdown of the plant will be permitted, as determined by the Engineer, at the time of the initial California Test 109. A second device shall be located either in the stream of aggregate beyond the belt or where it will monitor movement of the belt by detecting revolutions of the tail pulley on the belt feeder. The device for monitoring no-flow or belt movement, as the case may be, shall stop the plant automatically and immediately when there is no flow. The plant shall not be operated unless both low-flow and no-flow monitoring devices are in good working condition and functioning properly.

For continuous pugmill mixing plants, an aggregate sampling device that will provide a 60 to 80-pound sample of the combined aggregate while the plant is in full operation shall be provided in advance of the point where the aggregate enters the mixer.

For drier-drum mixing plants, an aggregate sampling device that will provide a 60 to 80-pound sample of the combined aggregate while the plant is in full operation shall be provided in advance of the point where the aggregate enters the drier-drum mixer.

When supplemental fine aggregate is used, a sampling device shall be installed in each feed line or surge tank preceding the proportioning device for the supplemental fine aggregate.

39-7.04 (BLANK)

39-7.05 MIXING

Aggregate, supplemental fine aggregate, and asphalt binder shall be mixed in a batch mixer, continuous mixing pugmill mixer, or continuous mixing drier-drum. The charge in a batch mixer, or the rate of feed to a continuous mixer, shall not exceed that which will permit complete mixing of the material. Dead areas in the mixer, in which the material does not move or is not sufficiently agitated, shall be corrected by a reduction in the volume of material or by other adjustments.

Asphalt binder shall be at a temperature of not less than 250° F nor more than 375° F when added to the aggregate.

The temperature of the aggregate before adding the binder shall not be more than 325° F.

39-7.05A Batch Mixing

When asphalt concrete is produced by batch mixing, the mixer shall be equipped with a sufficient number of paddles of a type and arrangement so as to produce a properly mixed batch.

The binder shall be introduced uniformly into the mixer along the center of the mixer parallel to the mixer shafts, or by pressure spraying. When a pan is used, it shall be equipped with movable vanes in order that the flow of binder may be directed across the width of the pan, as desired. The vanes shall be equipped with a means for quick adjustment, and a positive lock to prevent shifting.

The mixer platform shall be of ample size to provide safe and convenient access to the mixer and other equipment. The mixer housing and weighbox housing shall be equipped with gates of ample size to permit ready sampling of the discharge of aggregate from each of the plant bins and from each feed line or surge tank of supplemental fine aggregate, if used. The Contractor shall provide a sampling device capable of delivering a representative sample of sufficient size to permit the required tests.

The mixer shall be equipped with a timing device that will indicate by a definite audible or visual signal the expiration of the mixing period. The device shall measure the time of mixing within 2 seconds.

The time of mixing a batch shall begin on the charging stroke of the weighhopper dumping mechanism and shall end when discharge is started. Mixing shall continue until a homogeneous asphalt concrete mixture of uniformly distributed and properly coated aggregates of unchanging appearance is produced. The time of mixing shall be not less than 30 seconds.

An interval timer shall control the time of mixing. The interval timer shall be interlocked so that the mixer cannot be discharged until the materials have been mixed for the full amount of time specified.

39-7.05B Continuous Mixing

Continuous mixing plants shall utilize pugmill or drier-drum mixers.

When asphalt concrete is produced by pugmill mixing, the mixer shall be equipped with paddles of a type and arrangement to provide sufficient mixing action and movement to the asphalt concrete mixture to produce properly mixed asphalt concrete. The combined aggregate shall be fed directly from the drier to the mixer at a uniform and controlled rate.

Mixing shall continue until a homogeneous asphalt concrete mixture of thoroughly and uniformly coated aggregates of unchanging appearance is produced at the discharge point from the mixer.

The temperature of the completed asphalt concrete mixture shall not exceed 325° F upon discharge from the mixer.

The mixer shall discharge into a storage silo with a capacity of not less than that specified in Section 39-7.06, "Asphalt Concrete Storage," of this Section 11-1. The Contractor shall provide a means of diverting the flow of asphalt concrete away from the silo to prevent incompletely mixed portions of the asphalt concrete mixture from entering the silo.

39-7.06 ASPHALT CONCRETE STORAGE

When asphalt concrete is stored, it shall be stored only in silos. Asphalt concrete shall not be stockpiled. The minimum quantity of asphalt concrete in a silo during mixing shall be 20 tons except for the period immediately following a shutdown of the plant of 2 hours or more. A means shall be provided to indicate that storage in each silo is being maintained as required.

Storage silos shall be equipped with a surge-batcher sized to hold a minimum of 4,000 pounds of material. A surge-batcher consists of equipment placed at the top of the storage silo that catches the continuous delivery of the completed asphalt concrete mix and changes it to individual batch delivery to prevent the segregation of product ingredients as the completed asphalt concrete mix is placed into storage. The surge-batcher shall be center loading and shall be constructed to prevent material buildup. Rotary chutes shall not be used as surge-batchers.

The surge-batcher shall be independent and distinct from conveyors or chutes used to collect or direct the completed asphalt concrete mixture being discharged into storage silos and shall be the last device to handle the material before it enters the silo. Multiple storage silos shall be served by an individual surge-batcher for each silo. Material handling shall be free of oblique movement between the highest elevation (conveyor outfall) and subsequent placement in the silo. Discharge gates on surge-batchers shall be automatic in operation and shall discharge only after a minimum of 4,000 pounds of material has been collected and shall close before the last collected material leaves the device. Discharge gate design shall prevent the deflection of material during the opening and closing operation.

Asphalt concrete stored in excess of 18 hours shall not be used in the work. Asphalt concrete mixture containing hardened lumps shall not be used. A storage facility that contained the material with the hardened lumps shall not be used for further storage until the cause of the lumps is corrected.

39-7.07 ASPHALT CONCRETE PLANTS

Plants, including commercial plants, that produce asphalt concrete subject to these specifications shall conform to the provisions in Section 7-1.01F, "Air Pollution Control," of the Standard Specifications, and shall be equipped with a wet-tube dust washer or equal and other devices that will reduce the dust emission to the degree that adjacent property is not damaged. The washer and other equipment shall function efficiently when the plant is in operation.

During production, petroleum products such as diesel fuel and kerosene shall not be used as a release agent on belts, conveyors, hoppers, or hauling equipment.

Plants shall be equipped with an inspection dock constructed so that a quality control technician or inspector standing on the dock can inspect the completed asphalt concrete mixture and take samples, as necessary, from the hauling vehicle before the vehicle leaves the plant site. This inspection dock shall allow the hauling vehicle to pull alongside and shall meet applicable safety requirements of the California Division of Occupational Safety and Health. Haul vehicle drivers shall be instructed to stop at the dock whenever a quality control technician or inspector is on the dock and to remain there until directed to leave by that individual.

39-8 SUBGRADE, PRIME COAT, PAINT BINDER (TACK COAT), AND PAVEMENT REINFORCING FABRIC

39-8.01 SUBGRADE

Immediately prior to applying prime coat or paint binder (tack coat), or immediately prior to placing the asphalt concrete when a prime coat or paint binder (tack coat) is not required, the subgrade to receive asphalt concrete shall conform to the compaction requirement and elevation tolerances specified for the material involved and shall be free of loose or extraneous material. If the asphalt concrete is to be placed on an existing base or pavement that was not constructed as part of the contract, the surface shall be cleaned by sweeping, flushing or other means to remove loose particles of paving, dirt, and other extraneous material immediately before applying the prime coat or paint binder (tack coat).

39-8.02 PRIME COAT AND PAINT BINDER (TACK COAT)

A prime coat of liquid asphalt shall be applied to the areas to be surfaced when there is a contract item for the work or when the work is required in "Asphalt Concrete" in Section 10-1, "General," of these special provisions.

Prime coat shall be applied only to those areas designated by the Engineer.

Prime coat shall be applied at the approximate total rate of 0.25 gallon per square yard of surface covered. The exact rate and number of applications will be determined by the Engineer.

Prime coat shall be applied at a temperature conforming to the range of temperatures specified in Section 93-1.03, "Mixing and Applying," of the Standard Specifications for distributor application of the grade of liquid asphalt being used.

A paint binder (tack coat) of asphaltic emulsion shall be furnished and applied in conformance with the provisions in Section 94, "Asphaltic Emulsions," of the Standard Specifications and shall be applied to vertical surfaces of existing pavement, curbs, gutters, and construction joints in the surfacing against which additional material is to be placed, to a pavement to be surfaced, and to other surfaces designated in "Asphalt Concrete" in Section 10-1, "General," of these special provisions.

Paint binder (tack coat) shall be applied in one application at a rate of from 0.02 to 0.10-gallon per square yard of surface covered. The exact rate of application will be determined by the Engineer.

At the Contractor's option, paving asphalt may be used for paint binder (tack coat) instead of asphaltic emulsion. If paving asphalt is used, the grade to be used and the rate of application will be determined by the Engineer. The paving asphalt shall be applied at a temperature of not less than 285° F or more than 350° F.

Prime coat or paint binder (tack coat) shall be applied in advance of placing the surfacing only as far as shall be approved by the Engineer. When asphaltic emulsion is used as a paint binder (tack coat), the asphalt concrete shall not be placed until the asphaltic emulsion has cured.

Immediately in advance of placing asphalt concrete, additional prime coat or paint binder (tack coat) shall be applied as directed by the Engineer to areas where the prime coat or paint binder (tack coat) has been damaged. Loose or extraneous material shall be removed and no additional compensation will be allowed therefor.

39-8.03 PAVEMENT REINFORCING FABRIC

Pavement reinforcing fabric shall be placed on existing pavement to be surfaced or between layers of asphalt concrete when such work is shown on the plans, or specified in "Asphalt Concrete" in Section 10-1, of these special provisions, or ordered by the Engineer.

Before placing the pavement reinforcing fabric, a binder of paving asphalt shall be applied to the surface to receive the pavement reinforcing fabric at an approximate rate of 0.25 gallon per square yard of surface covered. The exact rate will be determined by the Engineer. The binder shall be applied to a width equal to the width of the fabric mat plus 3 inches on each side.

Before applying binder, large cracks, spalls, and depressions in existing pavement shall be repaired as directed by the Engineer and, if not included in the item, the repair work will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

The fabric shall be aligned and placed with no wrinkles that lap. The test for lapping shall be made by gathering together the fabric in a wrinkle. If the height of the doubled portion of extra fabric is 1/2 inch or more, the fabric shall be cut to remove the wrinkle, then lapped in the direction of paving. Lap in excess of 2 inches shall be removed. Pavement reinforcing fabric shall not be placed in areas of conform tapers where the thickness of the overlying asphalt concrete is 0.10 foot or less.

If manual laydown methods are used, the fabric shall be unrolled, aligned, and placed in increments of approximately 30 feet.

Adjacent borders of the fabric shall be lapped 2 to 4 inches. The preceding roll shall be lapped 2 to 4 inches over the following roll in the direction of paving at ends of rolls or at a break. At fabric overlays, both the binder and the fabric shall overlap previously placed fabric by the same amount.

Seating of the fabric with rolling equipment after placing will be permitted. Turning of the paving machine and other vehicles shall be gradual and kept to a minimum to avoid damage to the fabric.

A small quantity of asphalt concrete, to be determined by the Engineer, may be spread over the fabric immediately in advance of placing asphalt concrete surfacing in order to prevent fabric from being damaged by construction equipment.

Public traffic shall not be allowed on the bare reinforcing fabric, except that public cross traffic may be allowed to cross the fabric under traffic control after the Contractor has placed a small quantity of asphalt concrete over the fabric.

Care shall be taken to avoid tracking binder material onto the pavement reinforcing fabric or distorting the fabric during seating of the fabric with rolling equipment. If necessary to protect the pavement reinforcing fabric, exposed binder material may be covered lightly with sand.

39-9 SPREADING AND COMPACTING EQUIPMENT

39-9.01 SPREADING EQUIPMENT

Asphalt pavers shall be self-propelled mechanical spreading and finishing equipment provided with a screed or strike-off assembly capable of distributing the material to not less than the full width of a traffic lane unless otherwise approved by the Engineer. Screed action shall include cutting, crowding or other practical action that is effective on the asphalt concrete mixture without tearing, shoving or gouging and that produces a surface texture of uniform appearance. The screed shall be adjustable to the required section and thickness. The screed shall be provided with a suitable full width compacting device. Pavers that leave ridges, indentations or other marks in the surface shall not be used unless the ridges, indentations or marks are eliminated by rolling or prevented by adjustment in the operation.

When end dump haul vehicles are used, the asphalt paver shall operate independently of the vehicle being unloaded or shall be capable of propelling the vehicle being unloaded. The load of the haul vehicle shall be limited to that which will insure satisfactory spreading. While being unloaded, the haul vehicle shall be in contact with the machine and the brakes on the haul vehicle shall not be depended upon to maintain contact between the vehicle and the machine.

No portion of the weight of hauling or loading equipment, other than the connection, shall be supported by the asphalt paver. No vibrations or other motions of the loader that could have a detrimental effect on the riding quality of the completed pavement shall be transmitted to the paver.

When asphalt concrete is placed directly upon asphalt treated permeable base, the asphalt concrete shall be placed in a manner and with equipment that will not disturb or displace the asphalt treated permeable base.

39-9.02 COMPACTING EQUIPMENT

A sufficient number of rollers shall be provided to obtain the specified compaction and surface finish required by this Section 11-1. Rollers shall be sized to achieve the required results.

Rollers shall be equipped with pads and water systems that prevent sticking of the asphalt concrete mixtures to the pneumatic or steel-tired wheels. A parting agent that will not damage the asphalt concrete mixture may be used to aid in preventing the asphalt concrete mixture from sticking to the wheels.

39-10 SPREADING AND COMPACTING

39-10.01 GENERAL REQUIREMENTS

Asphalt concrete shall be handled, spread, and compacted in a manner which is in conformance with this Section 11-1, "Quality Control / Quality Assurance."

Asphalt concrete shall be placed in such a manner that cracking, shoving, and displacement will be avoided.

Type A and Type B asphalt concrete shall be placed only when the ambient temperature is above 50° F.

Asphalt concrete shall not be placed when the underlying layer or surface is frozen or not dry or when weather conditions will prevent proper handling, finishing or compaction of the mixture.

Asphalt concrete shall be spread and compacted in the layers and thicknesses indicated in the following table:

Asphalt Concrete Layers and Thickness
All thicknesses shown are in hundredths of a foot

Total Thickness Shown on the Plans*	Number of Layers	Top Layer Thickness		Next Lower Layer Thickness		All Other Lower Layers Thickness	
		Min.	Max.	Min.	Max.	Min.	Max.
24 or less	1	----	-----	----	----	----	----
25 through 29	2	11	15	11	15	----	----
30 through 44	2	15	20	15	25	—	—
45 or more	**	15	20	15	25	15	40

Notes:

*When pavement reinforcing fabric is shown to be placed between layers of asphalt concrete, the thickness of asphalt concrete above the pavement reinforcing fabric shall be considered to be the "Total Thickness Shown on the Plans" for the purpose of spreading and compacting the asphalt concrete above the pavement reinforcing fabric.

**At least 3 layers if total thickness is more than 0.44 foot and less than 0.90 foot. At least 4 layers if total thickness is 0.90 foot or more.

A layer shall not be placed over a layer that exceeds 0.25 foot in compacted thickness until the temperature of the layer being covered is less than 160° F at mid-depth unless approved by the Engineer.

Asphalt concrete to be placed on shoulders, and on other areas off the traveled way having a width of 5 feet or more, shall be spread in the same manner as specified above.

The completed mixture shall be deposited on the roadbed at a uniform quantity per linear foot, as necessary to provide the required compacted thickness without resorting to spotting, picking-up or otherwise shifting the mixture. During transporting, spreading and compacting, petroleum products such as diesel fuel and kerosene shall not be used as a release agent on trucks, spreaders or compactors in contact with the asphalt concrete.

Segregation shall be avoided. Surfacing shall be free from pockets of coarse or fine material. Asphalt concrete containing hardened lumps shall not be used.

Longitudinal joints in the top layer of Type A or Type B asphalt concrete shall correspond with the edges of planned traffic lanes. Longitudinal joints in other layers shall be offset not less than 0.50 foot alternately each side of the edges of traffic lanes.

Unless otherwise provided herein or approved by the Engineer, the top layer of asphalt concrete for shoulders, tapers, transitions, road connections, private drives, curve widenings, chain control lanes, turnouts, left-turn pockets, and other areas shall not be spread before the top layer of asphalt concrete for the adjoining through lane has been spread and compacted. At locations where the number of lanes is changed, the top layer for the through lanes shall be paved first. When existing pavement is to be surfaced and the specified thickness of asphalt concrete to be spread and compacted on the existing pavement is 0.25 foot or less, the shoulders or other adjoining areas may be spread simultaneously with the through lane provided the completed surfacing conforms to the requirement of this Section 11-1. Tracks or wheels of spreading equipment shall not be operated on the top layer of asphalt concrete until final compaction has been completed.

At those locations shown on the plans, as specified in "Asphalt Concrete" in Section 10-1, "General," of these special provisions, or as directed by the Engineer, the asphalt concrete shall be tapered or feathered to conform to existing surfacing or to other highway and non-highway facilities.

At locations where the asphalt concrete is to be placed over areas inaccessible to spreading and rolling equipment, the asphalt concrete shall be spread by practical means to obtain the specified results and shall be compacted thoroughly to the required lines, grades, and cross sections by means of pneumatic tampers or by other methods that will produce the same degree of compaction as pneumatic tampers.

39-10.02 PRODUCTION START-UP EVALUATION AND NUCLEAR DENSITY TEST STRIPS

The Contractor shall demonstrate that the proposed asphalt concrete mixture is being produced and placed on the roadway in conformance with this Section 11-1, "Quality Control / Quality Assurance." The production start-up evaluation shall demonstrate that the aggregates and asphalt concrete mixture conform to the requirements of Table 39-3, "Asphalt Concrete Mixture Requirements," and of Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1 when produced using the plant proposed for this project. The nuclear density test strip serves to provide the Contractor with a location to develop a correlation between cores taken from the test strip and the Contractor's and Engineer's nuclear density gage readings taken from the same locations on the test strip and for the Contractor to demonstrate the ability to achieve a minimum of 96 percent relative compaction.

Production start-up evaluation and the nuclear density test strip may be constructed separately or at the same time to serve both purposes. Asphalt concrete used in the nuclear density test strip shall be representative of the asphalt concrete that shall be placed in the project.

Should the test results or testing program fail to meet these criteria, production will be suspended and the Contractor shall resolve the problem in conformance with the provisions in Section 39-6, "Dispute Resolution," of this Section 11-1.

Attention is directed to longitudinal and transverse construction joint requirements specified in "Asphalt Concrete" in Section 10-1, "General," of these special provisions.

Test data used for the production start up evaluation and the nuclear gage test strips shall not be included with the test data used for acceptance of the work in conformance with the provisions in Section 39-11, "Acceptance of Work," of this Section 11-1.

A production start-up evaluation and a nuclear density test strip shall be used when production of asphalt concrete has been resumed following a suspension of production due to unsatisfactory material quality as specified in Section 39-4.04, "Contractor Process Control," Section 39-4.05, "Contractor Quality Control," and Section 39-11.02A, "General" of this Section 11-1.

39-10.02A Production Start-Up Evaluation

Before or on the first day of asphalt concrete production, the Contractor shall produce a trial quantity of between 276 tons and 551 tons of asphalt concrete to demonstrate that asphalt concrete produced for this project conforms to the quality characteristics of this Section 11-1. The location of the production start-up evaluation shall be approved by the Engineer.

Asphalt concrete shall be produced by production procedures intended for the entire project. Production of asphalt concrete shall stop after placement of the trial quantity of asphalt concrete. Asphalt concrete production and placement may resume after the quality characteristics of the asphalt concrete mixture have been tested and found to be in conformance with the quality requirements of this Section 11-1.

The Contractor shall randomly obtain 3 aggregate samples from the plant and 3 asphalt concrete mixture samples from the mat behind the paver. Each sample from the plant shall be split into 4 portions; each sample from the mat shall be split into 4 portions. One portion of each sample shall be tested by the Contractor and one portion of each sample shall be provided to the Engineer for testing. The remaining portions shall be delivered to the Engineer and stored for dispute resolution should the test results not conform to this Section 11-1. The Contractor and the Engineer shall evaluate the samples for conformance to the requirements for sand equivalent, stability, percent air voids, and the quality characteristics designated in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1. The percent air voids of the asphalt concrete mixture shall be within ± 1.0 percent of the percent air voids designated in the Contractor's mix design.

The trial quantity of asphalt concrete will be accepted if:

- A. Not more than 3 of the test results from the combined 6 test results from the Contractor's and Engineer's samples for quality characteristics indexed 2, 3, 4, and 5 in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1 are outside the specified limits.
- B. Not more than one of the test results from the combined 6 test results from the Contractor's and the Engineer's samples for sand equivalent, stability, percent air voids or critical start-up characteristics designated in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1 are outside the specified limits.

If the test results from the combined 6 test results fail to meet the conditions above, corrective action shall be taken, and a new trial quantity of asphalt concrete shall be placed and evaluated in conformance with the provisions in this section to demonstrate conformance. If the test results from the combined 6 test results fail to meet the requirements above, then the trial quantity of asphalt concrete will be rejected.

The testing program will be considered adequate only if the average of the Contractor's test results and the average of the Engineer's test results for sand equivalent, stability, percent air voids, and the quality characteristics designated in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1 are within the allowable testing difference designated in Table 39-6, "Allowable Testing Difference," of this Section 11-1.

The Contractor shall not proceed to regular production until the requirements of this Section 39-10.02A, "Production Start-Up Evaluation" have been met. At the request of the Contractor, the Engineer may elect to leave the asphalt concrete which does not meet the requirements of this Section 39-10.02A in place if mitigation at the Contractor's expense can be agreed to. If this quantity of asphalt concrete is left in place, the Contractor will be paid 75 percent of the contract price paid per ton for asphalt concrete.

The Contractor shall establish a correlation factor for stability of cured versus uncured briquettes. From a single split sample of asphalt concrete, 6 briquettes shall be fabricated. Three of the 6 briquettes shall be cured for 15 hours in conformance with the requirements of California Test 366 and 3 briquettes shall not be cured. The difference between the average stability value determined for the cured and the uncured specimens shall be considered the correlation factor, and shall be applied to stability values determined on uncured samples throughout the life of the project. The correlation factor may range from zero to 4. If the correlation factor is less than zero, a factor of zero shall be applied. If the factor is greater than 4, the correlation factor shall be approved by the Engineer.

39-10.02B Nuclear Density Test Strip

On the first day of placement of each layer of asphalt concrete the Contractor shall place a test strip in conformance with the requirements of California Test 375. The purpose of the test strip is to determine a correlation between cores taken from the test strip and the nuclear density gage readings taken at the core locations and to demonstrate that the asphalt concrete can be placed and compacted to the standards of this Section 11-1, "Quality Control / Quality Assurance." Asphalt concrete used in the nuclear density test strip shall be representative of the asphalt concrete that shall be placed in the project. The location for the nuclear density test strip shall be approved by the Engineer.

The Contractor shall place nuclear density test strips until conditions of the test method and this Section 11-1 have been met. The requirements of this section and the test method shall apply for the correlation of each gage that is used to determine relative compaction for this project. Relative compaction results will not be accepted if they have been determined using a nuclear gage that has not been correlated using a test strip.

Asphalt concrete in test strips may be left in place under the following conditions:

- A. If the relative compaction for the test strip is determined to be 96 percent or greater, the Contractor will be paid at the contract price per ton of asphalt concrete.
- B. If the relative compaction for the test strip is determined to be less than 96 percent but greater than 93 percent, the Contractor will be paid at 75 percent of the contract price per ton of asphalt concrete. A new test strip will be required, and mitigation measures shall be at Contractor's expense.

Asphalt concrete in test strips will be rejected when the relative compaction for the test strip is below 93 percent. Production and placement shall not begin until the Contractor has demonstrated the ability to achieve 96 percent relative compaction in conformance with this Section 11-1.

39-10.03 SPREADING

Layers shall be spread with an asphalt paver, unless otherwise specified or approved by the Engineer. Asphalt pavers shall be operated in such a manner as to insure continuous and uniform movement of the paver.

In advance of spreading asphalt concrete over an existing base, surfacing or bridge deck, if there is a contract item for asphalt concrete (leveling) or if ordered by the Engineer, asphalt concrete shall be spread by mechanical means that will produce a uniform smoothness and texture. Asphalt concrete (leveling) shall include, but not be limited to, the filling and leveling of irregularities and ruts. Asphalt concrete used to change the cross slope or profile of an existing surface shall not be considered as asphalt concrete (leveling).

Paint binder (tack coat) shall be applied to each layer in advance of spreading the next layer.

Before placing the top layer adjacent to cold transverse construction joints, the joints shall be trimmed to a vertical face on a neat line. Transverse joints shall be tested with a 12-foot \pm 0.20-foot straightedge and shall be cut back for surface smoothness as required in conformance with Section 39-10.04, "Compacting," of this Section 11-1. Connections to existing surfacing shall be feathered to conform to the requirements for smoothness. Longitudinal joints shall be trimmed to a vertical face and on a neat line if the edges of the previously laid surfacing are, in the opinion of the Engineer, in such a condition that the quality of the completed joint will be affected.

39-10.04 COMPACTING

Compacting equipment shall conform to the provisions in Section 39-9.02, "Compacting Equipment," of this Section 11-1, "Quality Control / Quality Assurance."

Rolling shall commence at the lower edge and shall progress toward the highest portion. When compacting layers that exceed 0.25 foot in compacted thickness, rolling shall commence at the center and shall progress outwards.

Asphalt concrete shall be compacted to a relative compaction of not less than 96 percent and shall be finished to the lines, grades, and cross sections shown on the plans. In-place density of asphalt concrete will be determined prior to opening the pavement to public traffic. No rolling will be permitted after the asphalt concrete temperature is below 140° F.

Asphalt concrete placed in dig outs, as a leveling course, for slope correction, for detours not included in the finished roadway prism, in areas where in the judgment of the Engineer compaction or compaction measurement by conventional methods is impeded or on the uppermost lift of shoulders with rumble strips shall be compacted by a method approved by the Engineer.

Relative compaction shall be determined in conformance with the requirements of California Test 375 except that only a nuclear gauge with thin lift capability shall be used for asphalt concrete layer of 0.13 to 0.19 foot in thickness. Laboratory specimens shall be compacted in conformance with the requirements of California Test 304. Test locations will be established for asphalt concrete areas to be tested, as specified in California Test 375. If the Contractor compacts the asphalt concrete in any form or quantity after sites for testing have been chosen in conformance with the requirements of California Test 375 or after California Test 375 has begun, the quality control tester shall choose a new set of random numbers for locating test sites.

Upon completion of rolling operations, if ordered by the Engineer, the asphalt concrete shall be cooled by applying water. Applying water shall conform to the provisions in Section 17, "Watering," of the Standard Specifications.

The completed surfacing shall be thoroughly compacted, smooth, and free from ruts, humps, depressions, or irregularities. Ridges, indentations or other objectionable marks left in the surface of the asphalt concrete by blading or other equipment shall be eliminated by rolling or other suitable means. The use of equipment that leaves ridges, indentations or other objectionable marks in the asphalt concrete shall be discontinued.

When a straightedge 12-foot \pm 0.20-foot long is laid on the finished surface and parallel with the centerline, the surface shall not vary more than 0.01-foot from the lower edge of the straightedge. The transverse slope of the finished surface shall be uniform to a degree such that no depressions greater than 0.02 foot are present when tested with a straightedge 12-foot \pm 0.20-foot long in a direction transverse to the centerline and extending from edge to edge of a 12-foot traffic lane.

Pavement within 50 feet of a structure or approach slab shall conform to the smoothness tolerances specified in Section 51-1.17, "Finishing Bridge Decks," of the Standard Specifications.

39-11 ACCEPTANCE OF WORK

39-11.01 GENERAL

The Engineer shall select the procedure used to determine the quantities of asphalt concrete for acceptance and payment determination in conformance with the provisions of this Section 11-1, "Quality Control / Quality Assurance."

Quality control test results that have been verified shall form the basis for statistical evaluation of the work in conformance with Section 39-11.02, "Statistical Evaluation and Determination of Pay Factor," of this Section 11-1. The quality requirements on which statistical evaluation will be based are specified in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1.

Work determined to be in conformance with the provisions of this Section 11-1 will be accepted and paid for at the contract price per ton for asphalt concrete and may be subject to compensation adjustment in conformance with Section 39-11.02C, "Pay Factor Determination and Compensation Adjustment," of this Section 11-1.

Work that is not in compliance with the provisions of this Section 11-1 may be rejected by the Engineer and shall be removed and replaced at the Contractor's expense.

When there are fewer than 5 verified quality control tests, the work will be accepted or rejected based on whether the individual test results meet the quality requirements specified in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1. Section 39-11.02, "Statistical Evaluation and Pay Factor Determination," of this Section 11-1 shall not apply.

Aggregates, asphalt binder, and asphalt concrete mixtures that do not conform to this Section 11-1 shall not be used.

The Engineer may reject a quantity of material that is determined to be defective based on visual inspection or noncompliance with the provisions of this Section 11-1.

39-11.02 STATISTICAL EVALUATION AND DETERMINATION OF PAY FACTOR

Statistical evaluation of the work shall be used to verify the Contractor's quality control test results to determine compliance with this Section 11-1, "Quality Control / Quality Assurance."

39-11.02A General

The quality characteristics to be evaluated and the specification limits are specified in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1. Asphalt content, aggregate gradation (No. 20 and No. 200 sieves), and relative compaction shall be considered for purposes of this Section 11-1 to be critical quality characteristics.

A lot represents the total quantity of asphalt concrete placed. More than one lot will occur if changes in the target values, material sources or mix design are requested by the Contractor and made in conformance with this Section 11-1 or if production of asphalt concrete is suspended due to unsatisfactory performance. However, asphalt concrete placed in dig outs, as a leveling course, for slope correction, for detours not to be included in the finished roadway prism, in areas where in the judgment of the Engineer compaction or compaction measurement by conventional methods is impeded or on the uppermost lift of shoulders with rumble strips shall be considered as a separate lot from other asphalt concrete. In addition, a new lot may be designated by the Engineer if the production and placement have been suspended for longer than 30 days due to seasonal suspension of phases of work.

A minimum of 5 samples shall be required to perform a statistical evaluation. The maximum obtainable pay factor with the 5 samples shall be 1.01. A minimum of 8 samples shall be required to obtain a pay factor of 1.05. If the sampling frequencies and quantity of work would otherwise result in fewer than 8 samples, the Contractor may submit a written request to increase the sampling frequency to provide a minimum of 8 samples. The request shall be included in the Quality Control Plan.

The lot will be accepted and a final pay factor determined when the Contractor's sampling, inspection, and test results are completed, have been submitted and evaluated, and the Engineer has visually inspected the pavement. Quality control test results shall be verified using the *t*-test in conformance with the provisions of Section 39-5.03, "Verification," of this Section 11-1 before the results will be used in considering the acceptance of asphalt concrete.

If the current composite pay factor of a lot is greater than 0.90, the lot will be accepted, provided the lowest single pay factor is not within the reject portion of Table 39-8, "Pay Factors," of this Section 11-1. If the lowest single pay factor is within the reject portion of Table 39-8, "Pay Factors," of this Section 11-1, the lot will be rejected. Rejected asphalt concrete shall be removed from the project site at the Contractor's expense.

If the current composite pay factor of a lot is less than 0.90, production of asphalt concrete shall be terminated and corrective action taken. Upon approval of the Engineer, up to 1102 tons of asphalt concrete may be placed to demonstrate that the asphalt concrete is once again in conformance with this Section 11-1. Production of asphalt concrete shall not start until the Engineer has received test results confirming conformance with this Section 11-1. A new lot will be established when production resumes.

If a pay factor for a critical quality characteristic designated in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1 is less than 0.90 for the lot or is within the rejection range for the last 5 tests, production of asphalt concrete shall be terminated and corrective action taken. Upon approval of the Engineer, up to 1102 tons of asphalt concrete may be placed to demonstrate that the asphalt concrete is once again in conformance with this Section 11-1. Production of asphalt concrete shall not start until the Engineer has received test results confirming conformance with this Section 11-1. A new lot will be established when production resumes.

Defective asphalt concrete may be voluntarily removed and replaced with new asphalt concrete to avoid a low pay factor. New material will be sampled, tested, and evaluated in conformance with this Section 11-1.

39-11.02B Statistical Evaluation

The Variability-Unknown/Standard Deviation Method will be used to determine the estimated percentage of the lot that is outside specification limits. The number of significant figures used in the calculations will be in conformance with the requirements of AASHTO Designation R-11, Absolute Method.

The estimated percentage of work that is outside of the specification limits for each quality characteristic will be determined as follows:

1. Calculate the arithmetic mean (\bar{X}) of the test values;

$$\bar{X} = \frac{x}{n}$$

where:

	=	summation of
x	=	individual test values
n	=	total number of test values

2. Calculate the standard deviation (s);

$$s = \sqrt{\frac{n \sum (x^2) - (\sum x)^2}{n(n-1)}}$$

where:

$\sum (x^2)$	=	summation of the squares of individual test values
$(\sum x)^2$	=	summation of the individual test values squared
n	=	total number of test values

3. Calculate the upper quality index (Q_u);

$$Q_u = \frac{USL - \bar{X}}{s}$$

where:

USL = upper specification limit
 s = standard deviation
 \bar{X} = arithmetic mean

(Note: The USL is equal to the upper specification limit or the target value plus the production tolerance.)

4. Calculate the lower quality index (Q_L);

$$Q_L = \frac{\bar{X} - LSL}{s}$$

where:

LSL = lower specification limit or target value minus production tolerance
 s = standard deviation
 \bar{X} = arithmetic mean

5. From Table 39-7, "Estimated Percent of Work Outside Specification Limits," of this Section 11-1, determine P_U ;

where:

P_U = the estimated percentage of work outside the USL.
 ($P_U = 0$, when USL is not specified.)

6. From Table 39-7, "Estimated Percent of Work Outside Specification Limits," of this Section 11-1, determine P_L ;

where:

P_L = the estimated percentage of work outside the LSL.
 ($P_L = 0$, when LSL is not specified.)

7. Calculate the total estimated percentage of work outside the USL and LSL, Percent Defective;

$$\text{Percent Defective} = P_U + P_L$$

where:

P_U = the estimated percentage of work outside the USL
 P_L = the estimated percentage of work outside the LSL

8. Repeat Steps 1 through 7 for each quality characteristic listed for acceptance.

39-11.02C Pay Factor Determination and Compensation Adjustment

The pay factor and compensation adjustment for a lot will be determined as follows:

1. From Table 39-8, "Pay Factors," of this Section 11-1, determine the pay factor for each quality characteristic, (PF_{QC}), using the total number of test result values and the total estimated percentage outside the specification limits ($P_U + P_L$) from Step 7 in Section 39-11.02B, "Statistical Evaluation," of this Section 11-1.

2. The pay factor for the lot is a composite of single pay factors determined for each quality characteristic designated in Table 39-9, "Minimum Quality Control Requirements," of this Section 11-1. The following formula is used:

$$PF_C = \sum_{i=1}^8 w_i PF_{QC_i}$$

where:

- PF_C = the composite pay factor for the lot,
- PF_{QC} = the pay factor for the individual quality characteristic,
- w = the weighting factor listed in Table 39-9, and
- i = the quality characteristic index number in Table 39-9.

3. Payment to the Contractor for the lot of asphalt concrete will be subject to a compensation adjustment. The Compensation Adjustment Factor (CAF) will be determined as follows:

$$CAF = PF_C - 1$$

4. The amount of the compensation adjustment will be calculated as the product of:
 - a. the Compensation Adjustment Factor (CAF)
 - b. the total tons represented in the lot, and
 - c. the contract price paid per ton for the item of asphalt concrete involved.

If the compensation adjustment is a negative value, the compensation adjustment will be deducted from moneys due, or that may become due, the Contractor under the contract. If the compensation adjustment is a positive value, the compensation adjustment will be added to moneys due, or that may become due, the Contractor under the contract.

Table 39-7.—ESTIMATED PERCENT OF WORK OUTSIDE SPECIFICATION LIMITS

P _U and/or P _L	Sample Size (n)												
	5	6	7	8	9	10-11	12-14	15-17	18-22	23-29	30-42	43-66	>66
	Upper Quality Index Q _U or Lower Quality Index Q _L												
0	1.72	1.88	1.99	2.07	2.13	2.20	2.28	2.34	2.39	2.44	2.48	2.51	2.56
1	1.64	1.75	1.82	1.88	1.91	1.96	2.01	2.04	2.07	2.09	2.12	2.14	2.16
2	1.58	1.66	1.72	1.75	1.78	1.81	1.84	1.87	1.89	1.91	1.93	1.94	1.95
3	1.52	1.59	1.63	1.66	1.68	1.71	1.73	1.75	1.76	1.78	1.79	1.80	1.81
4	1.47	1.52	1.56	1.58	1.60	1.62	1.64	1.65	1.66	1.67	1.68	1.69	1.70
5	1.42	1.47	1.49	1.51	1.52	1.54	1.55	1.56	1.57	1.58	1.59	1.59	1.60
6	1.38	1.41	1.43	1.45	1.46	1.47	1.48	1.49	1.50	1.50	1.51	1.51	1.52
7	1.33	1.36	1.38	1.39	1.40	1.41	1.41	1.42	1.43	1.43	1.44	1.44	1.44
8	1.29	1.31	1.33	1.33	1.34	1.35	1.35	1.36	1.36	1.37	1.37	1.37	1.38
9	1.25	1.27	1.28	1.28	1.29	1.29	1.30	1.30	1.30	1.31	1.31	1.31	1.31
10	1.21	1.23	1.23	1.24	1.24	1.24	1.25	1.25	1.25	1.25	1.25	1.26	1.26
11	1.18	1.18	1.19	1.19	1.19	1.19	1.20	1.20	1.20	1.20	1.20	1.20	1.20
12	1.14	1.14	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
13	1.10	1.10	1.10	1.10	1.10	1.10	1.11	1.11	1.11	1.11	1.11	1.11	1.11
14	1.07	1.07	1.07	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
15	1.03	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
16	1.00	0.99	0.99	0.99	0.99	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
17	0.97	0.96	0.95	0.95	0.95	0.95	0.94	0.94	0.94	0.94	0.94	0.94	0.94
18	0.93	0.92	0.92	0.92	0.91	0.91	0.91	0.91	0.90	0.90	0.90	0.90	0.90
19	0.90	0.89	0.88	0.88	0.88	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
20	0.87	0.86	0.85	0.85	0.84	0.84	0.84	0.83	0.83	0.83	0.83	0.83	0.83
21	0.84	0.82	0.82	0.81	0.81	0.81	0.80	0.80	0.80	0.80	0.80	0.80	0.79
22	0.81	0.79	0.79	0.78	0.78	0.77	0.77	0.77	0.76	0.76	0.76	0.76	0.76
23	0.77	0.76	0.75	0.75	0.74	0.74	0.74	0.73	0.73	0.73	0.73	0.73	0.73
24	0.74	0.73	0.72	0.72	0.71	0.71	0.70	0.70	0.70	0.70	0.70	0.70	0.70
25	0.71	0.70	0.69	0.69	0.68	0.68	0.67	0.67	0.67	0.67	0.67	0.67	0.66
Table continues below													

Table 39-7 (cont.).—ESTIMATED PERCENT OF WORK OUTSIDE SPECIFICATION LIMITS

P _U and/or P _L	Sample Size (n)												
	5	6	7	8	9	10-11	12-14	15-17	18-22	23-29	30-42	43-66	>66
	Upper Quality Index Q _U or Lower Quality Index Q _L												
26	0.68	0.67	0.67	0.65	0.65	0.65	0.64	0.64	0.64	0.64	0.64	0.64	0.63
27	0.65	0.64	0.63	0.62	0.62	0.62	0.61	0.61	0.61	0.61	0.61	0.61	0.60
28	0.62	0.61	0.60	0.59	0.59	0.59	0.58	0.58	0.58	0.58	0.58	0.58	0.57
29	0.59	0.58	0.57	0.57	0.56	0.56	0.55	0.55	0.55	0.55	0.55	0.55	0.54
30	0.56	0.55	0.54	0.54	0.53	0.53	0.52	0.52	0.52	0.52	0.52	0.52	0.52
31	0.53	0.52	0.51	0.51	0.50	0.50	0.50	0.49	0.49	0.49	0.49	0.49	0.49
32	0.50	0.49	0.48	0.48	0.48	0.47	0.47	0.47	0.46	0.46	0.46	0.46	0.46
33	0.47	0.48	0.45	0.45	0.45	0.44	0.44	0.44	0.44	0.43	0.43	0.43	0.43
34	0.45	0.43	0.43	0.42	0.42	0.42	0.41	0.41	0.41	0.41	0.41	0.41	0.40
35	0.42	0.40	0.40	0.39	0.39	0.39	0.38	0.38	0.38	0.38	0.38	0.38	0.38
36	0.39	0.38	0.37	0.37	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
37	0.36	0.35	0.34	0.34	0.34	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.32
38	0.33	0.32	0.32	0.31	0.31	0.31	0.30	0.30	0.30	0.30	0.30	0.30	0.30
39	0.30	0.30	0.29	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
40	0.28	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
41	0.25	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
42	0.23	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
43	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
44	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
45	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
46	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
47	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
48	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
49	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes:

1. If the value of Q_U or Q_L does not correspond to a value in the table, use the next lower value.
2. If Q_U or Q_L are negative values, P_U or P_L is equal to 100 minus the table value for P_U or P_L.

Table 39-8.—PAY FACTOR

Pay Factor	Sample Size (n)												
	5	6	7	8	9	10-11	12-14	15-17	18-22	23-29	30-42	43-66	>66
	Maximum Allowable Percent of Work Outside Specification Limits for A Given Pay Factor ($P_U + P_L$)												
1.05				0	0	0	0	0	0	0	0	0	0
1.04			0	1	3	5	4	4	4	3	3	3	3
1.03		0	2	4	6	8	7	7	6	5	5	4	4
1.02		1	3	6	9	11	10	9	8	7	7	6	6
1.01	0	2	5	8	11	13	12	11	10	9	8	8	7
1.00	22	20	18	17	16	15	14	13	12	11	10	9	8
0.99	24	22	20	19	18	17	16	15	14	13	11	10	9
0.98	26	24	22	21	20	19	18	16	15	14	13	12	10
0.97	28	26	24	23	22	21	19	18	17	16	14	13	12
0.96	30	28	26	25	24	22	21	19	18	17	16	14	13
0.95	32	29	28	26	25	24	22	21	20	18	17	16	14
0.94	33	31	29	28	27	25	24	22	21	20	18	17	15
0.93	35	33	31	29	28	27	25	24	22	21	20	18	16
0.92	37	34	32	31	30	28	27	25	24	22	21	19	18
0.91	38	36	34	32	31	30	28	26	25	24	22	21	19
0.90	39	37	35	34	33	31	29	28	26	25	23	22	20
0.89	41	38	37	35	34	32	31	29	28	26	25	23	21
0.88	42	40	38	36	35	34	32	30	29	27	26	24	22
0.87	43	41	39	38	37	35	33	32	30	29	27	25	23
0.86	45	42	41	39	38	36	34	33	31	30	28	26	24
0.85	46	44	42	40	39	38	36	34	33	31	29	28	25
0.84	47	45	43	42	40	39	37	35	34	32	30	29	27
0.83	49	46	44	43	42	40	38	36	35	33	31	30	28
0.82	50	47	46	44	43	41	39	38	36	34	33	31	29
0.81	51	49	47	45	44	42	41	39	37	36	34	32	30
0.80	52	50	48	46	45	44	42	40	38	37	35	33	31
0.79	54	51	49	48	46	45	43	41	39	38	36	34	32
0.78	55	52	50	49	48	46	44	42	41	39	37	35	33
0.77	56	54	52	50	49	47	45	43	42	40	38	36	34
0.76	57	55	53	51	50	48	46	44	43	41	39	37	35
0.75	58	56	54	52	51	49	47	46	44	42	40	38	36
Reject	60	57	55	53	52	51	48	47	45	43	41	40	37
	61	58	56	55	53	52	50	48	46	44	43	41	38
	62	59	57	56	54	53	51	49	47	45	44	42	39
	63	61	58	57	55	54	52	50	48	47	45	43	40
	64	62	60	58	57	55	53	51	49	48	46	44	41
Reject Values Greater Than Those Shown Above													

Notes:

- To obtain a pay factor when the estimated percent outside specification limits from Table 39-7, "Estimated Percent of Work Outside Specification Limits," does not correspond to a value in the table, use the next larger value.
- The maximum obtainable pay factor is 1.05 (with a minimum of 8 test values).

Table 39-9.—MINIMUM QUALITY CONTROL REQUIREMENTS

Index (i)	Quality Characteristic	Specification Limits	Weighting Factor (w)	California Test	Minimum Sampling and Testing Frequency	Point of Sampling
1	Asphalt Content ^{2,3}	TV \pm 0.5%	0.30	379 or 382	One sample per 551 tons or part thereof Not less than one sample per day	Mat behind paver
2	Gradation 3/4" or 1/2" ⁴	TV \pm 5	0.01	202	One sample per 551 tons or part thereof	Batch Plant - from hot bins
3	3/8"	TV \pm 6	0.01		Not less than one sample per day	Drum Plant - from cold feed
4	No. 4	TV \pm 7	0.05			
5	No. 8	TV \pm 5	0.05			
6	No. 30 ^{2,3}	TV \pm 4	0.08			
7	No. 200 ²	TV \pm 2	0.10			
8	Relative Compaction ²	96%	0.40	375 ⁵	One sample per 551 tons or part thereof Not less than one test per day	Finished mat after final rolling
	Test Maximum Density			375	Per Test Method	Mat behind the paver
9	Mix Moisture Content	1%		370	One sample per 1102 tons or part thereof Not less than one sample per day	
	Asphalt and Mix Temperature	248° F to 374° F (Asphalt) 329° F (Mix)			Continuous using an automated recording device	Plant

Notes:

1. TV = Target Value from contractor's proposed mix design.
2. Depending on aggregate gradation specified.
3. Quality characteristics 1, 6, 7, and 8 are defined as critical quality characteristics in the verification testing process.
4. Quality characteristics 1, 6, and 7 are defined as critical start-up characteristics in the Production Start-Up Evaluation.
5. California Test 375, Part 3, Section B, "Testing Frequency," is revised to change 496 tons to 551 tons and 50 tons to 55 tons.

39-12 MEASUREMENT AND PAYMENT

39-12.01 MEASUREMENT

Asphalt concrete will be measured by weight. The quantity to be paid for will be the combined weight of the mixture for the various types of asphalt concrete, as designated in the Engineer's Estimate.

The weight of the materials will be determined in conformance with the provisions in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications.

Quantities of paving asphalt, liquid asphalt, and asphaltic emulsion to be paid for as contract items of work will be determined in conformance with the methods provided in Section 92, "Asphalts," Section 93, "Liquid Asphalts," or Section 94, "Asphaltic Emulsions," of the Standard Specifications, as the case may be.

When recorded batch weights are printed automatically, these weights may be used for determining pay quantities provided the following requirements are complied with:

- A. Total aggregate and supplemental fine aggregate weight per batch shall be printed. When supplemental fine aggregate is weighed cumulatively with the aggregate, the total batch weight of aggregate shall include the supplemental fine aggregate.
- B. The total bitumen weight per batch shall be printed.
- C. Zero-tolerance weight shall be printed prior to weighing the first batch and after weighing the last batch of each truckload.
- D. The time, date, mix number, load number, and truck identification shall be correlated with the load slip.
- E. A copy of the recorded batch weights shall be certified by a licensed weighmaster and submitted to the Engineer.

Pavement reinforcing fabric will be measured and paid for by the square yard for the actual pavement area covered.

39-12.02 PAYMENT

Asphalt concrete placed in the work, unless otherwise specified, will be paid for at the contract price per ton for asphalt concrete of the types designated in the Engineer's Estimate.

Compensation adjustment for asphalt concrete will be in conformance with Section 39-11.02C, "Pay Factor Determination and Compensation Adjustment," of this Section 11-1, "Quality Control / Quality Assurance."

When there is a contract item for asphalt concrete (leveling), quantities of asphalt concrete placed for leveling will be paid for at the contract price per ton for asphalt concrete (leveling). When there is no contract item for asphalt concrete (leveling), and leveling is ordered by the Engineer, asphalt concrete so used will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

For asphalt concrete placed in dig outs, as a leveling course, for slope correction, for detours not included in the finished roadway prism, in areas where in the judgment of the Engineer compaction or compaction measurement by conventional methods is impeded or on the uppermost lift of shoulders with rumble strips the relative compaction provisions of Section 39-11.02, "Statistical Evaluation and Determination of Pay Factor," of this Section 11-1, shall not apply. In the computation of the composite pay factor (PF_C) for the lot composed of this asphalt concrete, an individual pay factor of 1.0 for the relative compaction (PF_{QC8}) shall be used.

Full compensation for the Contractor's Quality Control Plan, including furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in developing, implementing, modifying, and fulfilling the requirements of the Quality Control Plan shall be considered as included in the contract price paid per ton for asphalt concrete of the types designated in the Engineer's Estimate and no additional compensation will be allowed therefor.

Full compensation for Contractor sampling, testing, inspection, testing facilities, and preparation and submission of results shall be considered as included in the contract price paid per ton for asphalt concrete of the types designated in the Engineer's Estimate and no additional compensation will be allowed therefor.

Quantities of pavement reinforcing fabric placed and paving asphalt applied as a binder for the pavement reinforcing fabric will be paid for at the contract price per square yard for pavement reinforcing fabric and per ton for paving asphalt (binder-pavement reinforcing fabric). Full compensation for furnishing and spreading sand to cover exposed binder material, if necessary, shall be considered as included in the contract price paid per ton for paving asphalt (binder-pavement reinforcing fabric) and no separate payment will be made therefor.

Small quantities of asphalt concrete placed on pavement reinforcing fabric to prevent the fabric from being displaced by construction equipment or to allow public traffic to cross over the fabric shall be considered as part of the layer of asphalt concrete to be placed over the fabric and will be measured and paid for by the ton as asphalt concrete of the types designated in the Engineer's Estimate.

When there is a contract item for liquid asphalt (prime coat), the quantity of prime coat will be paid for at the contract price per ton for the designated grade of liquid asphalt (prime coat). When there is no contract item for liquid asphalt (prime coat) and the special provisions require the application of a prime coat, full compensation for furnishing and applying the prime coat shall be considered as included in the contract price paid per ton for asphalt concrete of the types designated in the Engineer's Estimate and no separate payment will be made therefor.

When there is a contract item for asphaltic emulsion (paint binder), the quantity of asphaltic emulsion or paving asphalt used as paint binder (tack coat) will be paid for at the contract price per ton for asphaltic emulsion (paint binder). When there is no contract item for asphaltic emulsion (paint binder), full compensation for furnishing and applying paint binder (tack coat) shall be considered as included in the contract price paid per ton for asphalt concrete of the types designated in the Engineer's Estimate and no separate payment will be made therefor.

Fog seal coat will be paid for as provided in Section 37-1, "Seal Coats," of the Standard Specifications.

No adjustment of compensation will be made for an increase or decrease in the quantities of paint binder (tack coat) or fog seal coat required, regardless of the reason for such increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications shall not apply to the items of paint binder or fog seal coat.

The above contract prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing asphalt concrete, complete in place, as shown on the plans, as specified in this Section 11-1, "Quality Control / Quality Assurance," and "Asphalt Concrete" in Section 10-1, "General," of these special provisions, and as directed by the Engineer.

SECTION 11-2. PORTLAND CEMENT CONCRETE

11-2.01 GENERAL

Portland cement concrete shall conform to the provisions in this Section 11-2, "Portland Cement Concrete," and the section entitled "Portland Cement Concrete" in Section 8, "Materials," of these special provisions. Section 90, "Portland Cement Concrete," of the Standard Specifications is deleted. Section 90, "Portland Cement Concrete," of the Standard Specifications is amended to read as follows.

SECTION 90: PORTLAND CEMENT CONCRETE

90-1 GENERAL

90-1.01 DESCRIPTION

- Portland cement concrete shall be composed of cementitious material, fine aggregate, coarse aggregate, admixtures if used, and water, proportioned and mixed as specified in these specifications.

- The Contractor shall determine the mix proportions for all concrete except pavement concrete. The Engineer will determine the mix proportions for pavement concrete. Concrete for which the mix proportions are determined either by the Contractor or the Engineer shall conform to the requirements of this Section 90.

- Unless otherwise specified, cementitious material shall be a combination of cement and mineral admixture. Cementitious material shall be either:

1. "Type IP (MS) Modified" cement; or
2. A combination of "Type II Modified" portland cement and mineral admixture; or
3. A combination of Type V portland cement and mineral admixture.

- Type III portland cement shall be used only as allowed in the special provisions or with the approval of the Engineer.

- Class D concrete shall contain not less than 675 pounds of cementitious material per cubic yard.
- Class A concrete shall contain not less than 590 pounds of cementitious material per cubic yard.
- Class B concrete shall contain not less than 505 pounds of cementitious material per cubic yard.
- Class C concrete shall contain not less than 422 pounds of cementitious material per cubic yard.
- Minor concrete shall contain not less than 548 pounds of cementitious material per cubic yard unless otherwise specified in these specifications or the special provisions.

- Unless otherwise designated on the plans or specified in these specifications or the special provisions, the amount of cementitious material used per cubic yard of concrete in structures or portions of structures shall conform to the following:

Use	Cementitious Material Content (lb/yd ³)
Concrete designated by compressive strength:	
Deck slabs and slab spans of bridges	675 min., 801 max.
Roof sections of exposed top box culverts	675 min., 801 max.
Other portions of structures	590 min., 801 max.
Concrete not designated by compressive strength:	
Deck slabs and slab spans of bridges	675 min.
Roof sections of exposed top box culverts	675 min.
Prestressed members	675 min.
Seal courses	675 min.
Other portions of structures	590 min.
Concrete for precast members	590 min., 927 max.

- Whenever the 28-day compressive strength shown on the plans is greater than 3626 pounds per square inch, the concrete shall be designated by compressive strength. If the plans show a 28-day compressive strength that is 4061 pounds per square inch or greater, an additional 14 days will be allowed to obtain the specified strength. The 28-day compressive strengths shown on the plans that are 3626 pounds per square inch or less are shown for design information only and are not a requirement for acceptance of the concrete.

- Concrete designated by compressive strength shall be proportioned such that the concrete will attain the strength shown on the plans or specified in the special provisions.

- Before using concrete for which the mix proportions have been determined by the Contractor, or in advance of revising those mix proportions, the Contractor shall submit in writing to the Engineer a copy of the mix design.

- Compliance with cementitious material content requirements will be verified in conformance with procedures described in California Test 518 for cement content. For testing purposes, mineral admixture shall be considered to be cement. Batch proportions shall be adjusted as necessary to produce concrete having the specified cementitious material content.

- If any concrete has a cementitious material, portland cement, or mineral admixture content that is less than the minimum required, the concrete shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place and the Contractor shall pay to the State \$0.25 for each pound of cementitious material, portland cement, or mineral admixture that is less than the minimum required. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract. The deductions will not be made unless the difference between the contents required and those actually provided exceeds the batching tolerances permitted by Section 90-5, "Proportioning." No deductions will be made based on the results of California Test 518.

- The requirements of the preceding paragraph shall not apply to minor concrete or commercial quality concrete.

90-2 MATERIALS

90-2.01 CEMENT

- Unless otherwise specified, cement shall be either "Type IP (MS) Modified" cement, "Type II Modified" portland cement or Type V portland cement.

- "Type IP (MS) Modified" cement shall conform to the requirements for Type IP (MS) cement in ASTM Designation: C 595, and shall be comprised of an intimate and uniform blend of Type II cement and not more than 35 percent by weight of mineral admixture. The type and minimum amount of mineral admixture used in the manufacture of "Type IP (MS) Modified" cement shall be in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures."

- "Type II Modified" portland cement shall conform to the requirements for Type II portland cement in ASTM Designation: C 150.

- In addition, "Type IP (MS) Modified" cement and "Type II Modified" portland cement shall conform to the following requirements:

- A. The cement shall not contain more than 0.60 percent by weight of alkalis, calculated as the percentage of Na₂O plus 0.658 times the percentage of K₂O, when determined by either direct intensity flame photometry or by the atomic absorption method. The instrument and procedure used shall be qualified as to precision and accuracy in conformance with the requirements in ASTM Designation: C 114;
- B. The autoclave expansion shall not exceed 0.50 percent; and

- C. Mortar, containing the cement to be used and Ottawa sand, when tested in conformance with California Test 527, shall not expand in water more than 0.010 percent and shall not contract in air more than 0.048 percent, except that when cement is to be used for precast prestressed concrete piling, precast prestressed concrete members, or steam cured concrete products, the mortar shall not contract in air more than 0.053 percent.

- Type III and Type V portland cements shall conform to the requirements in ASTM Designation: C 150 and the additional requirements listed above for "Type II Modified" portland cement, except that when tested in conformance with California Test 527, mortar containing Type III portland cement shall not contract in air more than 0.075 percent.

- Cement used in the manufacture of cast-in-place concrete for exposed surfaces of like elements of a structure shall be from the same cement mill.

- Cement shall be protected from exposure to moisture until used. Sacked cement shall be piled to permit access for tally, inspection, and identification of each shipment.

- Adequate facilities shall be provided to assure that cement meeting the provisions specified in this Section 90-2.01 shall be kept separate from other cement in order to prevent any but the specified cement from entering the work. Safe and suitable facilities for sampling cement shall be provided at the weigh hopper or in the feed line immediately in advance of the hopper, in conformance with California Test 125.

- If cement is used prior to sampling and testing as provided in Section 6-1.07, "Certificates of Compliance," and the cement is delivered directly to the site of the work, the Certificate of Compliance shall be signed by the cement manufacturer or supplier of the cement. If the cement is used in ready-mixed concrete or in precast concrete products purchased as such by the Contractor, the Certificate of Compliance shall be signed by the manufacturer of the concrete or product.

- Cement furnished without a Certificate of Compliance shall not be used in the work until the Engineer has had sufficient time to make appropriate tests and has approved the cement for use.

90-2.02 AGGREGATES

- Aggregates shall be free from deleterious coatings, clay balls, roots, bark, sticks, rags, and other extraneous material.
- Natural aggregates shall be thoroughly and uniformly washed before use.
- The Contractor, at the Contractor's expense, shall provide safe and suitable facilities, including necessary splitting devices for obtaining samples of aggregates, in conformance with California Test 125.

- Aggregates shall be of such character that it will be possible to produce workable concrete within the limits of water content provided in Section 90-6.06, "Amount of Water and Penetration."

- Aggregates shall have not more than 10 percent loss when tested for soundness in conformance with the requirements in California Test 214. The soundness requirement for fine aggregate will be waived, provided that the durability index, D_f , of the fine aggregate is 60, or greater, when tested for durability in conformance with California Test 229.

- If the results of any one or more of the Cleanness Value, Sand Equivalent, or aggregate grading tests do not meet the requirements specified for "Operating Range" but all meet the "Contract Compliance" requirements, the placement of concrete shall be suspended at the completion of the current pour until tests or other information indicate that the next material to be used in the work will comply with the requirements specified for "Operating Range."

- If the results of either or both the Cleanness Value and coarse aggregate grading tests do not meet the requirements specified for "Contract Compliance," the concrete that is represented by the tests shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place, and the Contractor shall pay to the State \$2.09 per cubic yard for paving concrete and \$3.27 per cubic yard for all other concrete for the concrete represented by these tests and left in place. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract.

- If the results of either or both the Sand Equivalent and fine aggregate grading tests do not meet the requirements specified for "Contract Compliance," the concrete which is represented by the tests shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place, and the Contractor shall pay to the State \$2.09 per cubic yard for paving concrete and \$3.27 per cubic yard for all other concrete for the concrete represented by these tests and left in place. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract.

- The 2 preceding paragraphs apply individually to the "Contract Compliance" requirements for coarse aggregate and fine aggregate. When both coarse aggregate and fine aggregate do not conform to the "Contract Compliance" requirements, both paragraphs shall apply. The payments specified in those paragraphs shall be in addition to any payments made in conformance with the provisions in Section 90-1.01, "Description."

- No single Cleanness Value, Sand Equivalent or aggregate grading test shall represent more than 327 cubic yards of concrete or one day's pour, whichever is smaller.

- Aggregates specified for freeze-thaw resistance shall pass the freezing and thawing test, California Test 528.
- The Contractor shall notify the Engineer of the proposed source of freeze-thaw resistant concrete aggregates at least 4 months before intended use. Should the Contractor later propose a different source of concrete aggregates, the Contractor shall again notify the Engineer at least 4 months before intended use. Blending of fine or coarse aggregates from untested sources with acceptable aggregates will not be permitted. Provisions for the time of submission of samples as provided in Section 40-1.015, "Cement Content," are superseded by the foregoing.
- Concurrently with notification of proposed sources of freeze-thaw resistant concrete aggregates, the Contractor shall furnish samples in the quantity ordered by the Engineer. The samples shall be secured under the direct supervision of the Engineer. Samples from existing stockpiles of processed aggregate shall be taken from washed materials and shall be visibly damp. Samples from materials in place in a material source shall be taken at depths from the existing surface that will ensure the presence of the full quantity of ground water. Excavations for the purpose of securing samples shall be made to the full depth of intended source operations. Samples shall be protected against loss of contained water until they are delivered to the Engineer.
- The Engineer will waive the above freeze-thaw test and the 4-month advance notice, required in this Section, provided aggregates are to be obtained from sources that have previously passed this test and test results are currently applicable.
- No extension of contract time will be allowed for the time required to perform the freezing and thawing test.
- When the source of an aggregate is changed, except for pavement concrete, the Contractor shall adjust the mix proportions and submit in writing to the Engineer a copy of the mix design before using the aggregates. When the source of an aggregate is changed for pavement concrete, the Engineer shall be allowed sufficient time to adjust the mix, and the aggregates shall not be used until necessary adjustments are made.

90-2.02A Coarse Aggregate

- Coarse aggregate shall consist of gravel, crushed gravel, crushed rock, crushed air-cooled iron blast furnace slag or combinations thereof. Crushed air-cooled blast furnace slag shall not be used in reinforced or prestressed concrete.
- Coarse aggregate shall conform to the following quality requirements:

Tests	California Test	Requirements
Loss in Los Angeles Rattler (after 500 revolutions)	211	45% max.
Cleanliness Value		
Operating Range	227	75 min.
Contract Compliance	227	71 min.

- In lieu of the above Cleanliness Value requirements, a Cleanliness Value "Operating Range" limit of 71, minimum, and a Cleanliness Value "Contract Compliance" limit of 68, minimum, will be used to determine the acceptability of the coarse aggregate if the Contractor furnishes a Certificate of Compliance, as provided in Section 6-1.07, "Certificates of Compliance," certifying that:

1. coarse aggregate sampled at the completion of processing at the aggregate production plant had a Cleanliness Value of not less than 82 when tested by California Test 227; and
2. prequalification tests performed in conformance with the requirements in California Test 549 indicated that the aggregate would develop a relative strength of not less than 95 percent and would have a relative shrinkage not greater than 105 percent, based on concrete.

90-2.02B Fine Aggregate

- Fine aggregate shall consist of natural sand, manufactured sand produced from larger aggregate or a combination thereof. Manufactured sand shall be well graded.
- Fine aggregate shall conform to the following quality requirements:

Test	California Test	Requirements
Organic Impurities	213	Satisfactory ^a
Mortar Strengths Relative to Ottawa Sand	515	95%, min.
Sand Equivalent:		
Operating Range	217	75, min.
Contract Compliance	217	71, min.

a Fine aggregate developing a color darker than the reference standard color solution may be accepted if it is determined by the Engineer, from mortar strength tests, that a darker color is acceptable.

- In lieu of the above Sand Equivalent requirements, a Sand Equivalent "Operating Range" limit of 71 minimum and a Sand Equivalent "Contract Compliance" limit of 68 minimum will be used to determine the acceptability of the fine aggregate if the Contractor furnishes a Certificate of Compliance, as provided in Section 6-1.07, "Certificates of Compliance," certifying that:

- fine aggregate sampled at the completion of processing at the aggregate production plant had a Sand Equivalent value of not less than 82 when tested by California Test 217; and
- prequalification tests performed in conformance with California Test 549 indicated that the aggregate would develop a relative strength of not less than 95 percent and would have a relative shrinkage not greater than 105 percent, based on concrete.

90-2.03 WATER

- In conventionally reinforced concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 1000 parts per million of chlorides as Cl, when tested in conformance with California Test 422, nor more than 1300 parts per million of sulfates as SO₄, when tested in conformance with California Test 417. In prestressed concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 650 parts per million of chlorides as Cl, when tested in conformance with California Test 422, nor more than 1300 parts per million of sulfates as SO₄, when tested in conformance with California Test 417. In no case shall the water contain an amount of impurities that will cause either: 1) a change in the setting time of cement of more than 25 percent when tested in conformance with the requirements in ASTM Designation: C 191 or ASTM Designation: C 266 or 2) a reduction in the compressive strength of mortar at 14 days of more than 5 percent, when tested in conformance with the requirements in ASTM Designation: C 109, when compared to the results obtained with distilled water or deionized water, tested in conformance with the requirements in ASTM Designation: C 109.

- In non-reinforced concrete work, the water for curing, for washing aggregates and for mixing shall be free from oil and shall not contain more than 2000 parts per million of chlorides as Cl, when tested in conformance with California Test 422, or more than 1500 parts per million of sulfates as SO₄, when tested in conformance with California Test 417.

- In addition to the above provisions, water for curing concrete shall not contain impurities in a sufficient amount to cause discoloration of the concrete or produce etching of the surface.

- Water reclaimed from mixer wash-out operations may be used in mixing concrete. The water shall not contain coloring agents or more than 300 parts per million of alkalis (Na₂O + 0.658 K₂O) as determined on the filtrate. The specific gravity of the water shall not exceed 1.03 and shall not vary more than ±0.010 during a day's operations.

90-2.04 ADMIXTURE MATERIALS

- Admixture materials shall conform to the requirements in the following ASTM Designations:

- Chemical Admixtures—ASTM Designation: C 494.
- Air-entraining Admixtures—ASTM Designation: C 260.
- Calcium Chloride—ASTM Designation: D 98.
- Mineral Admixtures—Coal fly ash; raw or calcined natural pozzolan as specified in ASTM Designation: C 618; silica fume conforming to the requirements in ASTM Designation: C 1240, with reduction of mortar expansion of 80 percent, minimum, using the cement from the proposed mix design.

- Unless otherwise specified in the special provisions, mineral admixtures shall be used in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures."

90-3 AGGREGATE GRADINGS

90-3.01 GENERAL

- Before beginning concrete work, the Contractor shall submit in writing to the Engineer the gradation of the primary aggregate nominal sizes that the Contractor proposes to furnish. If a primary coarse aggregate or the fine aggregate is separated into 2 or more sizes, the proposed gradation shall consist of the gradation for each individual size, and the proposed proportions of each individual size, combined mathematically to indicate one proposed gradation. The proposed gradation shall meet the grading requirements shown in the table in this section, and shall show the percentage passing each of the sieve sizes used in determining the end result.
- The Engineer may waive, in writing, the gradation requirements in this Section 90-3.01 and in Sections 90-3.02, "Coarse Aggregate Grading," 90-3.03, "Fine Aggregate Grading," and 90-3.04, "Combined Aggregate Gradings," if, in the Engineer's opinion, furnishing the gradation is not necessary for the type or amount of concrete work to be constructed.
- Gradations proposed by the Contractor shall be within the following percentage passing limits:

Primary Aggregate Nominal Size	Sieve Size	Limits of Proposed Gradation
1 1/2" x 3/4"	1"	19 - 41
1" x No. 4	3/4"	52 - 85
1" x No. 4	3/8"	15 - 38
1/2" x No. 4	3/8"	40 - 78
3/8" x No. 8	3/8"	50 - 85
Fine Aggregate	No. 16	55 - 75
Fine Aggregate	No. 30	34 - 46
Fine Aggregate	No. 50	16 - 29

- Should the Contractor change the source of supply, the Contractor shall submit in writing to the Engineer the new gradations before their intended use.

90-3.02 COARSE AGGREGATE GRADING

- The grading requirements for coarse aggregates are shown in the following table for each size of coarse aggregate:

Sieve Sizes	Percentage Passing Primary Aggregate Nominal Sizes							
	1 1/2" x 3/4"		1" x No. 4		1/2" x No. 4		3/8" x No. 8	
	Operating Range	Contract Compliance	Operating Range	Contract Compliance	Operating Range	Contract Compliance	Operating Range	Contract Compliance
2"	100	100	—	—	—	—	—	—
1 1/2"	88-100	85-100	100	100	—	—	—	—
1"	x ± 18	X ± 25	88-100	86-100	—	—	—	—
3/4"	0-17	0-20	X ± 15	X ± 22	100	100	—	—
1/2"	—	—	—	—	82-100	80-100	100	100
3/8"	0-7	0-9	X ± 15	X ± 22	X ± 15	X ± 22	X ± 15	X ± 20
No. 4	—	—	0-16	0-18	0-15	0-18	0-25	0-28
No. 8	—	—	0-6	0-7	0-6	0-7	0-6	0-7

- In the above table, the symbol X is the gradation that the Contractor proposes to furnish for the specific sieve size as provided in Section 90-3.01, "General."
- Coarse aggregate for the 1 1/2", maximum, combined aggregate grading as provided in Section 90-3.04, "Combined Aggregate Gradings," shall be furnished in 2 or more primary aggregate nominal sizes. Each primary aggregate nominal size may be separated into 2 sizes and stored separately, provided that the combined material conforms to the grading requirements for that particular primary aggregate nominal size.
- When the 1", maximum, combined aggregate grading as provided in Section 90-3.04, "Combined Aggregate Gradings," is to be used, the coarse aggregate may be separated into 2 sizes and stored separately, provided that the combined material shall conform to the grading requirements for the 1" x No. 4 primary aggregate nominal size.

90-3.03 FINE AGGREGATE GRADING

- Fine aggregate shall be graded within the following limits:

Sieve Sizes	Percentage Passing	
	Operating Range	Contract Compliance
3/8"	100	100
No. 4	95-100	93-100
No. 8	65-95	61-99
No. 16	X ± 10	X ± 13
No. 30	X ± 9	X ± 12
No. 50	X ± 6	X ± 9
No. 100	2-12	1-15
No. 200	0-8	0-10

- In the above table, the symbol X is the gradation that the Contractor proposes to furnish for the specific sieve size as provided in Section 90-3.01, "General."
- In addition to the above required grading analysis, the distribution of the fine aggregate sizes shall be such that the difference between the total percentage passing the No. 16 sieve and the total percentage passing the No. 30 sieve shall be between 10 and 40, and the difference between the percentage passing the No. 30 and No. 50 sieves shall be between 10 and 40.
- Fine aggregate may be separated into 2 or more sizes and stored separately, provided that the combined material conforms to the grading requirements specified in this Section 90-3.03.

90-3.04 COMBINED AGGREGATE GRADINGS

- Combined aggregate grading limits shall be used only for the design of concrete mixes. Concrete mixes shall be designed so that aggregates are combined in proportions that shall produce a mixture within the grading limits for combined aggregates as specified herein. Within these limitations, the relative proportions shall be as ordered by the Engineer, except as otherwise provided in Section 90-1.01, "Description."
- The combined aggregate grading used in portland cement concrete pavement shall be the 37.5-mm, maximum grading.
- The combined aggregate grading used in concrete for structures and other concrete items, except when specified otherwise in these specifications or the special provisions, shall be either the 1 1/2", maximum grading, or the 1", maximum grading, at the option of the Contractor.

Grading Limits of Combined Aggregates

Sieve Sizes	Percentage Passing			
	1 1/2" Max.	1" Max.	1/2" Max.	3/8" Max.
2"	100	—	—	—
1 1/2"	90-100	100	—	—
1"	50-86	90-100	—	—
3/4"	45-75	55-100	100	—
1/2"	—	—	90-100	100
3/8"	38-55	45-75	55-86	50 - 100
No. 4	30-45	35-60	45-63	45 - 63
No. 8	23-38	27-45	35-49	35 - 49
No. 16	17-33	20-35	25-37	25 - 37
No. 30	10-22	12-25	15-25	15 - 25
No. 50	4-10	5-15	5-15	5 - 15
No. 100	1-6	1-8	1-8	1 - 8
No. 200	0-3	0-4	0-4	0 - 4

- Changes from one grading to another shall not be made during the progress of the work unless permitted by the Engineer.

90-4 ADMIXTURES

90-4.01 GENERAL

- Admixtures used in portland cement concrete shall conform to and be used in conformance with the provisions in this Section 90-4 and the special provisions. Admixtures shall be used when specified or ordered by the Engineer and may be used at the Contractor's option as provided herein.
- Chemical admixtures and air-entraining admixtures containing chlorides as Cl in excess of one percent by weight of admixture, as determined by California Test 415, shall not be used in prestressed or reinforced concrete.
- Calcium chloride shall not be used in concrete containing steel reinforcement or other embedded metals.
- Mineral admixture used in concrete for exposed surfaces of like elements of a structure shall be from the same source and of the same percentage.
- Admixtures shall be uniform in properties throughout their use in the work. Should it be found that an admixture as furnished is not uniform in properties, its use shall be discontinued.
- If more than one admixture is used, the admixtures shall be compatible with each other so that the desirable effects of all admixtures used will be realized.

90-4.02 MATERIALS

- Admixture materials shall conform to the provisions in Section 90-2.04, "Admixture Materials."

90-4.03 ADMIXTURE APPROVAL

- No admixture brand shall be used in the work unless it is on the Department's current list of approved brands for the type of admixture involved.
- Admixture brands will be considered for addition to the approved list if the manufacturer of the admixture submits to the Transportation Laboratory a sample of the admixture accompanied by certified test results demonstrating that the admixture complies with the requirements in the appropriate ASTM Designation and these specifications. The sample shall be sufficient to permit performance of all required tests. Approval of admixture brands will be dependent upon a determination as to compliance with the requirements, based on the certified test results submitted, together with tests the Department may elect to perform.
- When the Contractor proposes to use an admixture of a brand and type on the current list of approved admixture brands, the Contractor shall furnish a Certificate of Compliance from the manufacturer, as provided in Section 6-1.07, "Certificates of Compliance," certifying that the admixture furnished is the same as that previously approved. If a previously approved admixture is not accompanied by a Certificate of Compliance, the admixture shall not be used in the work until the Engineer has had sufficient time to make the appropriate tests and has approved the admixture for use. The Engineer may take samples for testing at any time, whether or not the admixture has been accompanied by a Certificate of Compliance.
- If a mineral admixture is delivered directly to the site of the work, the Certificate of Compliance shall be signed by the manufacturer or supplier of the mineral admixture. If the mineral admixture is used in ready-mix concrete or in precast concrete products purchased as such by the Contractor, the Certificate of Compliance shall be signed by the manufacturer of the concrete or product.

90-4.04 REQUIRED USE OF CHEMICAL ADMIXTURES AND CALCIUM CHLORIDE

- When the use of a chemical admixture or calcium chloride is specified or ordered by the Engineer, the admixture shall be used at the dosage specified or ordered, except that if no dosage is specified or ordered, the admixture shall be used at the dosage normally recommended by the manufacturer of the admixture.
- Calcium chloride shall be dispensed in liquid, flake, or pellet form. Calcium chloride dispensed in liquid form shall conform to the provisions for dispensing liquid admixtures in Section 90-4.10, "Proportioning and Dispensing Liquid Admixtures."

90-4.05 OPTIONAL USE OF CHEMICAL ADMIXTURES

- The Contractor will be permitted to use Type A or F, water-reducing; Type B, retarding; or Type D or G, water-reducing and retarding admixtures as described in ASTM Designation: C 494 to conserve cementitious material or to facilitate any concrete construction application subject to the following conditions:
 - A. When a water-reducing admixture or a water-reducing and retarding admixture is used, the cementitious material content specified or ordered may be reduced by a maximum of 5 percent by weight, except that the resultant cementitious material content shall be not less than 506 pounds per cubic yard; and
 - B. When a reduction in cementitious material content is made, the dosage of admixture used shall be the dosage used in determining approval of the admixture.

- Unless otherwise specified, a Type C accelerating chemical admixture conforming to the requirements in ASTM Designation: C 494, may be used in portland cement concrete. Inclusion in the mix design submitted for approval will not be required provided that the admixture is added to counteract changing conditions that contribute to delayed setting of the portland cement concrete, and the use or change in dosage of the admixture is approved in writing by the Engineer.

90-4.06 REQUIRED USE OF AIR-ENTRAINING ADMIXTURES

- When air-entrainment is specified or ordered by the Engineer, the air-entraining admixture shall be used in amounts to produce a concrete having the specified air content as determined by California Test 504.

90-4.07 OPTIONAL USE OF AIR-ENTRAINING ADMIXTURES

- When air-entrainment has not been specified or ordered by the Engineer, the Contractor will be permitted to use an air-entraining admixture to facilitate the use of any construction procedure or equipment provided that the average air content, as determined by California Test 504, of 3 successive tests does not exceed 4 percent, and no single test value exceeds 5.5 percent. If the Contractor elects to use an air-entraining admixture in concrete for pavement, the Contractor shall so indicate at the time the Contractor designates the source of aggregate as provided in Section 40-1.015, "Cement Content."

90-4.08 REQUIRED USE OF MINERAL ADMIXTURES

- Unless otherwise specified, mineral admixture shall be combined with cement to make cementitious material.
- The calcium oxide content of mineral admixtures shall not exceed 10 percent and the available alkali, as sodium oxide equivalent, shall not exceed 1.5 percent when determined in conformance with the requirements in ASTM Designation: C 618.

- The amounts of cement and mineral admixture used in cementitious material shall be sufficient to satisfy the minimum cementitious material content requirements specified in Section 90-1.01, "Description," or Section 90-4.05, "Optional Use of Chemical Admixtures," and shall conform to the following:

- A. The minimum amount of cement shall not be less than 75 percent by weight of the specified minimum cementitious material content;
- B. The minimum amount of mineral admixture to be combined with cement shall be determined using one of the following criteria:
 1. When the calcium oxide content of a mineral admixture is equal to or less than 2 percent by weight, the amount of mineral admixture shall not be less than 15 percent by weight of the total amount of cementitious material to be used in the mix;
 2. When the calcium oxide content of a mineral admixture is greater than 2 percent, the amount of mineral admixture shall not be less than 25 percent by weight of the total amount of cementitious material to be used in the mix;
 3. When a mineral admixture that conforms to the provisions for silica fume in Section 90-2.04, "Admixture Materials," is used, the amount of mineral admixture shall not be less than 10 percent by weight of the total amount of cementitious material to be used in the mix
- C. The total amount of mineral admixture shall not exceed 35 percent by weight of the total amount of cementitious material to be used in the mix. Where Section 90-1.01, "Description," specifies a maximum cementitious content in pounds per cubic yard, the total weight of cement and mineral admixture per cubic yard shall not exceed the specified maximum cementitious material content.

90-4.09 BLANK

90-4.10 PROPORTIONING AND DISPENSING LIQUID ADMIXTURES

- Chemical admixtures and air-entraining admixtures shall be dispensed in liquid form. Dispensers for liquid admixtures shall have sufficient capacity to measure at one time the prescribed quantity required for each batch of concrete. Each dispenser shall include a graduated measuring unit into which liquid admixtures are measured to within ± 5 percent of the prescribed quantity for each batch. Dispensers shall be located and maintained so that the graduations can be accurately read from the point at which proportioning operations are controlled to permit a visual check of batching accuracy prior to discharge. Each measuring unit shall be clearly marked for the type and quantity of admixture.

- Each liquid admixture dispensing system shall be equipped with a sampling device consisting of a valve located in a safe and readily accessible position such that a sample of the admixture may be withdrawn slowly by the Engineer.
- If more than one liquid admixture is used in the concrete mix, each liquid admixture shall have a separate measuring unit and shall be dispensed by injecting equipment located in such a manner that the admixtures are not mixed at high concentrations and do not interfere with the effectiveness of each other. When air-entraining admixtures are used in conjunction with other liquid admixtures, the air-entraining admixture shall be the first to be incorporated into the mix.
- When automatic proportioning devices are required for concrete pavement, dispensers for liquid admixtures shall operate automatically with the batching control equipment. The dispensers shall be equipped with an automatic warning system in good operating condition that will provide a visible or audible signal at the point at which proportioning operations are controlled when the quantity of admixture measured for each batch of concrete varies from the preselected dosage by more than 5 percent, or when the entire contents of the measuring unit are not emptied from the dispenser into each batch of concrete.
- Unless liquid admixtures are added to premeasured water for the batch, their discharge into the batch shall be arranged to flow into the stream of water so that the admixtures are well dispersed throughout the batch, except that air-entraining admixtures may be dispensed directly into moist sand in the batching bins provided that adequate control of the air content of the concrete can be maintained.
- Liquid admixtures requiring dosages greater than 2 quarts/yd³ shall be considered to be water when determining the total amount of free water as specified in Section 90-6.06, "Amount of Water and Penetration."
- Special admixtures, such as "high range" water reducers that may contribute to a high rate of slump loss, shall be measured and dispensed as recommended by the admixture manufacturer and as approved by the Engineer.

90-4.11 STORAGE, PROPORTIONING, AND DISPENSING OF MINERAL ADMIXTURES

- Mineral admixtures shall be protected from exposure to moisture until used. Sacked material shall be piled to permit access for tally, inspection and identification for each shipment.
- Adequate facilities shall be provided to assure that mineral admixtures meeting the specified requirements are kept separate from other mineral admixtures in order to prevent any but the specified mineral admixtures from entering the work. Safe and suitable facilities for sampling mineral admixtures shall be provided at the weigh hopper or in the feed line immediately in advance of the hopper.
- Mineral admixtures shall be incorporated into concrete using equipment conforming to the requirements for cement weigh hoppers, and charging and discharging mechanisms in ASTM Designation: C 94, in Section 90-5.03, "Proportioning," and in this Section 90-4.11.
- When concrete is completely mixed in stationary paving mixers, the mineral admixture shall be weighed in a separate weigh hopper conforming to the provisions for cement weigh hoppers and charging and discharging mechanisms in Section 90-5.03A, "Proportioning for Pavement," and the mineral admixture and cement shall be introduced simultaneously into the mixer proportionately with the aggregate. If the mineral admixture is not weighed in a separate weigh hopper, the Contractor shall provide certification that the stationary mixer is capable of mixing the cement, admixture, aggregates and water uniformly prior to discharge. Certification shall contain the following:
 - A. Test results for 2 compressive strength test cylinders of concrete taken within the first one-third and 2 compressive strength test cylinders of concrete taken within the last one-third of the concrete discharged from a single batch from the stationary paving mixer. Strength tests and cylinder preparation will be in conformance with the provisions of Section 90-9, "Compressive Strength;"
 - B. Calculations demonstrating that the difference in the averages of 2 compressive strengths taken in the first one-third is no greater than 7.5 percent different than the averages of 2 compressive strengths taken in the last one-third of the concrete discharged from a single batch from the stationary paving mixer. Strength tests and cylinder preparation will be in conformance with the provisions of Section 90-9, "Compressive Strength;" and
 - C. The mixer rotation speed and time of mixing prior to discharge that are required to produce a mix that meets the requirements above.

90-5 PROPORTIONING

90-5.01 STORAGE OF AGGREGATES

- Aggregates shall be stored or stockpiled in such a manner that separation of coarse and fine particles of each size shall be avoided and also that the various sizes shall not become intermixed before proportioning.
- Aggregates shall be stored or stockpiled and handled in a manner that shall prevent contamination by foreign materials. In addition, storage of aggregates at batching or mixing facilities that are erected subsequent to the award of the contract and that furnish concrete to the project shall conform to the following:

- A. Intermingling of the different sizes of aggregates shall be positively prevented. The Contractor shall take the necessary measures to prevent intermingling. The preventive measures may include, but are not necessarily limited to, physical separation of stockpiles or construction of bulkheads of adequate length and height; and
- B. Contamination of aggregates by contact with the ground shall be positively prevented. The Contractor shall take the necessary measures to prevent contamination. The preventive measures shall include, but are not necessarily limited to, placing aggregates on wooden platforms or on hardened surfaces consisting of portland cement concrete, asphalt concrete, or cement treated material.

- In placing aggregates in storage or in moving the aggregates from storage to the weigh hopper of the batching plant, any method that may cause segregation, degradation, or the combining of materials of different gradings that will result in any size of aggregate at the weigh hopper failing to meet the grading requirements, shall be discontinued. Any method of handling aggregates that results in excessive breakage of particles shall be discontinued. The use of suitable devices to reduce impact of falling aggregates may be required by the Engineer.

90-5.02 PROPORTIONING DEVICES

- Weighing, measuring, or metering devices used for proportioning materials shall conform to the requirements in Section 9-1.01, "Measurement of Quantities," and this Section 90-5.02. In addition, automatic weighing systems shall comply with the requirements for automatic proportioning devices in Section 90-5.03A, "Proportioning for Pavement." Automatic devices shall be automatic to the extent that the only manual operation required for proportioning the aggregates, cement, and mineral admixture for one batch of concrete is a single operation of a switch or starter.

- Proportioning devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to ensure their accuracy.

- Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the plant is in operation, the weight of each batch of material shall not vary from the weight designated by the Engineer by more than the tolerances specified herein.

- Equipment for cumulative weighing of aggregate shall have a zero tolerance of ± 0.5 percent of the designated total batch weight of the aggregate. For systems with individual weigh hoppers for the various sizes of aggregate, the zero tolerance shall be ± 0.5 percent of the individual batch weight designated for each size of aggregate. Equipment for cumulative weighing of cement and mineral admixtures shall have a zero tolerance of ± 0.5 percent of the designated total batch weight of the cement and mineral admixture. Equipment for weighing cement or mineral admixture separately shall have a zero tolerance of ± 0.5 percent of their designated individual batch weights. Equipment for measuring water shall have a zero tolerance of ± 0.5 percent of its designated weight or volume.

- The weight indicated for any batch of material shall not vary from the preselected scale setting by more than the following:

- A. Aggregate weighed cumulatively shall be within 1.0 percent of the designated total batch weight of the aggregate. Aggregates weighed individually shall be within 1.5 percent of their respective designated batch weights; and
- B. Cement shall be within 1.0 percent of its designated batch weight. When weighed individually, mineral admixture shall be within 1.0 percent of its designated batch weight. When mineral admixture and cement are permitted to be weighed cumulatively, cement shall be weighed first to within 1.0 percent of its designated batch weight, and the total for cement and mineral admixture shall be within 1.0 percent of the sum of their designated batch weight; and
- C. Water shall be within 1.5 percent of its designated weight or volume.

- Each scale graduation shall be approximately 0.001 of the total capacity of the scale. The capacity of scales for weighing cement, mineral admixture, or cement plus mineral admixture and aggregates shall not exceed that of commercially available scales having single graduations indicating a weight not exceeding the maximum permissible weight variation above, except that no scale shall be required having a capacity of less than 1102 pounds, with one pound graduations.

90-5.03 PROPORTIONING

- Proportioning shall consist of dividing the aggregates into the specified sizes, each stored in a separate bin, and combining them with cement, mineral admixture, and water as provided in these specifications. Aggregates shall be proportioned by weight.

- At the time of batching, aggregates shall have been dried or drained sufficiently to result in a stable moisture content such that no visible separation of water from aggregate will take place during transportation from the proportioning plant to the point of mixing. In no event shall the free moisture content of the fine aggregate at the time of batching exceed 8 percent of its saturated, surface-dry weight.

- Should separate supplies of aggregate material of the same size group, but of different moisture content or specific gravity or surface characteristics affecting workability, be available at the proportioning plant, withdrawals shall be made from one supply exclusively and the materials therein completely exhausted before starting upon another.
- Bulk "Type IP (MS) Modified" cement shall be weighed in an individual hopper and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer.
- Bulk cement and mineral admixture may be weighed in separate, individual weigh hoppers or may be weighed in the same weigh hopper and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer. If the cement and mineral admixture are weighed cumulatively, the cement shall be weighed first.
- When cement and mineral admixtures are weighed in separate weigh hoppers, the weigh systems for the proportioning of the aggregate, the cement, and the mineral admixture shall be individual and distinct from all other weigh systems. Each weigh system shall be equipped with a hopper, a lever system, and an indicator to constitute an individual and independent material weighing device. The cement and the mineral admixture shall be discharged into the mixer simultaneously with the aggregate.
- The scales and weigh hoppers for bulk weighing cement, mineral admixture, or cement plus mineral admixture shall be separate and distinct from the aggregate weighing equipment.
- For batches with a volume of 1.3 cubic yards or more, the batching equipment shall conform to one of the following combinations:
 - A. Separate boxes and separate scale and indicator for weighing each size of aggregate.
 - B. Single box and scale indicator for all aggregates.
 - C. Single box or separate boxes and automatic weighing mechanism for all aggregates.
- In order to check the accuracy of batch weights, the gross weight and tare weight of batch trucks, truck mixers, truck agitators, and non-agitating hauling equipment shall be determined when ordered by the Engineer. The equipment shall be weighed at the Contractor's expense on scales designated by the Engineer.

90-5.03A Proportioning for Pavement

- Aggregates and bulk cement, mineral admixture, and cement plus mineral admixture for use in pavement shall be proportioned by weight by means of automatic proportioning devices of approved type conforming to these specifications.
- The Contractor shall install and maintain in operating condition an electronically actuated moisture meter that will indicate, on a readily visible scale, changes in the moisture content of the fine aggregate as it is batched within a sensitivity of 0.5 percent by weight of the fine aggregate.
- The batching of cement, mineral admixture, or cement plus mineral admixture and aggregate shall be interlocked so that a new batch cannot be started until all weigh hoppers are empty, the proportioning devices are within zero tolerance, and the discharge gates are closed. The interlock shall permit no part of the batch to be discharged until all aggregate hoppers and the cement and mineral admixture hoppers or the cement plus mineral admixture hopper are charged with weights that are within the tolerances specified in Section 90-5.02, "Proportioning Devices."
- When interlocks are required for cement and mineral admixture charging mechanisms and cement and mineral admixtures are weighed cumulatively, their charging mechanisms shall be interlocked to prevent the introduction of mineral admixture until the weight of cement in the cement weigh hopper is within the tolerances specified in Section 90-5.02, "Proportioning Devices."
- The discharge gate on the cement and mineral admixture hoppers or the cement plus mineral admixture hopper shall be designed to permit regulating the flow of cement, mineral admixture, or cement plus mineral admixture into the aggregate as directed by the Engineer.
- When separate weigh boxes are used for each size of aggregate, the discharge gates shall permit regulating the flow of each size of aggregate as directed by the Engineer.
- Material discharged from the several bins shall be controlled by gates or by mechanical conveyors. The means of withdrawal from the several bins, and of discharge from the weigh box, shall be interlocked so that not more than one bin can discharge at a time, and so that the weigh box cannot be tripped until the required quantity from each of the several bins has been deposited therein. Should a separate weigh box be used for each size of aggregate, all may be operated and discharged simultaneously.
- When the discharge from the several bins is controlled by gates, each gate shall be actuated automatically so that the required weight is discharged into the weigh box, after which the gate shall automatically close and lock.
- The automatic weighing system shall be designed so that all proportions required may be set on the weighing controller at the same time.

90-6 MIXING AND TRANSPORTING

90-6.01 GENERAL

- Concrete shall be mixed in mechanically operated mixers, except that when permitted by the Engineer, batches not exceeding 0.33 yd³ may be mixed by hand methods in conformance with the provisions in Section 90-6.05, "Hand-Mixing."
- Equipment having components made of aluminum or magnesium alloys that would have contact with plastic concrete during mixing, transporting, or pumping of portland cement concrete shall not be used.
- Concrete shall be homogeneous and thoroughly mixed, and there shall be no lumps or evidence of undispersed cement, mineral admixture, or cement plus mineral admixture.
- Uniformity of concrete mixtures will be determined by differences in penetration as determined by California Test 533, or slump as determined by ASTM Designation: C 143, and by variations in the proportion of coarse aggregate as determined by California Test 529.
- When the mix design specifies a penetration value, the difference in penetration, determined by comparing penetration tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed 3/8". When the mix design specifies a slump value, the difference in slump, determined by comparing slump tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed the values given in the table below. Variation in the proportion of coarse aggregate will be determined by comparing the results of tests of 2 samples of mixed concrete from the same batch or truck mixer load and the difference between the 2 results shall not exceed 169 pounds per cubic yard of concrete.

Average Slump	Maximum Permissible Difference
Less than 4"	1"
4" to 6"	1 1/2"
Greater than 6" to 9"	2"

- The Contractor, at the Contractor's expense, shall furnish samples of the freshly mixed concrete and provide satisfactory facilities for obtaining the samples.

90-6.02 MACHINE MIXING

- Concrete mixers may be of the revolving drum or the revolving blade type, and the mixing drum or blades shall be operated uniformly at the mixing speed recommended by the manufacturer. Mixers and agitators that have an accumulation of hard concrete or mortar shall not be used.
- The temperature of mixed concrete, immediately before placing, shall be not less than 50° F or more than 90° F. Aggregates and water shall be heated or cooled as necessary to produce concrete within these temperature limits. Neither aggregates nor mixing water shall be heated to exceed 149° F. If ice is used to cool the concrete, discharge of the mixer will not be permitted until all ice is melted.
- The batch shall be so charged into the mixer that some water will enter in advance of cementitious materials and aggregates. All water shall be in the drum by the end of the first one - fourth of the specified mixing time.
- Cementitious materials shall be batched and charged into the mixer by means that will not result either in loss of cementitious materials due to the effect of wind, in accumulation of cementitious materials on surfaces of conveyors or hoppers, or in other conditions that reduce or vary the required quantity of cementitious material in the concrete mixture.
- Paving and stationary mixers shall be operated with an automatic timing device. The timing device and discharge mechanism shall be interlocked so that during normal operation no part of the batch will be discharged until the specified mixing time has elapsed.
- The total elapsed time between the intermingling of damp aggregates and all cementitious materials and the start of mixing shall not exceed 30 minutes.
- The size of batch shall not exceed the manufacturer's guaranteed capacity.
- When producing concrete for pavement or base, suitable batch counters shall be installed and maintained in good operating condition at jobsite batching plants and stationary mixers. The batch counters shall indicate the exact number of batches proportioned and mixed.
- Concrete shall be mixed and delivered to the jobsite by means of one of the following combinations of operations:
 - A. Mixed completely in a stationary mixer and the mixed concrete transported to the point of delivery in truck agitators or in non-agitating hauling equipment (central-mixed concrete).
 - B. Mixed partially in a stationary mixer, and the mixing completed in a truck mixer (shrink-mixed concrete).

- C. Mixed completely in a truck mixer (transit-mixed concrete).
- D. Mixed completely in a paving mixer.

- Agitators may be truck mixers operating at agitating speed or truck agitators. Each mixer and agitator shall have attached thereto in a prominent place a metal plate or plates on which is plainly marked the various uses for which the equipment is designed, the manufacturer's guaranteed capacity of the drum or container in terms of the volume of mixed concrete and the speed of rotation of the mixing drum or blades.

- Truck mixers shall be equipped with electrically or mechanically actuated revolution counters by which the number of revolutions of the drum or blades may readily be verified.

- When shrink-mixed concrete is furnished, concrete that has been partially mixed at a central plant shall be transferred to a truck mixer and all requirements for transit-mixed concrete shall apply. No credit in the number of revolutions at mixing speed shall be allowed for partial mixing in a central plant.

90-6.03 TRANSPORTING MIXED CONCRETE

- Mixed concrete may be transported to the delivery point in truck agitators or truck mixers operating at the speed designated by the manufacturer of the equipment as agitating speed, or in non-agitating hauling equipment, provided the consistency and workability of the mixed concrete upon discharge at the delivery point is suitable for adequate placement and consolidation in place, and provided the mixed concrete after hauling to the delivery point conforms to the provisions in Section 90-6.01, "General."

- Truck agitators shall be loaded not to exceed the manufacturer's guaranteed capacity and shall maintain the mixed concrete in a thoroughly mixed and uniform mass during hauling.

- Bodies of non-agitating hauling equipment shall be constructed so that leakage of the concrete mix, or any part thereof, will not occur at any time.

- Concrete hauled in open-top vehicles shall be protected during hauling against rain or against exposure to the sun for more than 20 minutes when the ambient temperature exceeds 75° F.

- No additional mixing water shall be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer. If the Engineer authorizes additional water to be incorporated into the concrete, the drum shall be revolved not less than 30 revolutions at mixing speed after the water is added and before discharge is commenced.

- The rate of discharge of mixed concrete from truck mixer-agitators shall be controlled by the speed of rotation of the drum in the discharge direction with the discharge gate fully open.

- When a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be completed within 1.5 hours or before 250 revolutions of the drum or blades, whichever occurs first, after the introduction of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 86° F or above, the time allowed may be less than 1.5 hours.

- When non-agitating hauling equipment is used for transporting concrete to the delivery point, discharge shall be completed within one hour after the addition of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 86° F or above, the time between the introduction of cement to the aggregates and discharge shall not exceed 45 minutes.

- Each load of concrete delivered at the jobsite shall be accompanied by a weighmaster certificate showing the mix identification number, non-repeating load number, date and time at which the materials were batched, the total amount of water added to the load, and for transit-mixed concrete, the reading of the revolution counter at the time the truck mixer is charged with cement. This weighmaster certificate shall also show the actual scale weights (pounds) for the ingredients batched. Theoretical or target batch weights shall not be used as a substitute for actual scale weights.

- Weighmaster certificates shall be provided in printed form, or if approved by the Engineer, the data may be submitted in electronic media. Electronic media shall be presented in a tab-delimited format on a 90 mm diskette with a capacity of at least 1.4 megabytes. Captured data, for the ingredients represented by each batch shall be "line feed, carriage return" (LFCR) and "one line, separate record" with allowances for sufficient fields to satisfy the amount of data required by these specifications.

- The Contractor may furnish a weighmaster certificate accompanied by a separate certificate that lists the actual batch weights or measurements for a load of concrete provided that both certificates are imprinted with the same non-repeating load number that is unique to the contract and delivered to the jobsite with the load.

- Weighmaster certificates furnished by the Contractor shall conform to the provisions in Section 9-1.01, "Measurement of Quantities."

90-6.04 TIME OR AMOUNT OF MIXING

- Mixing of concrete in paving or stationary mixers shall continue for the required mixing time after all ingredients, except water and admixture, if added with the water, are in the mixing compartment of the mixer before any part of the batch is released. Transfer time in multiple drum mixers shall not be counted as part of the required mixing time.
- The required mixing time, in paving or stationary mixers, of concrete used for concrete structures, except minor structures, shall be not less than 90 seconds or more than 5 minutes, except that when directed by the Engineer in writing, the requirements of the following paragraph shall apply.
- The required mixing time, in paving or stationary mixers, except as provided in the preceding paragraph, shall be not less than 50 seconds or more than 5 minutes.
- The minimum required revolutions at the mixing speed for transit-mixed concrete shall not be less than that recommended by the mixer manufacturer, but in no case shall the number of revolutions be less than that required to consistently produce concrete conforming to the provisions for uniformity in Section 90-6.01, "General."

90-6.05 HAND-MIXING

- Hand-mixed concrete shall be made in batches of not more than 0.33 yd³ and shall be mixed on a watertight, level platform. The proper amount of coarse aggregate shall be measured in measuring boxes and spread on the platform and the fine aggregate shall be spread on this layer, the 2 layers being not more than one foot in total depth. On this mixture shall be spread the dry cement and mineral admixture and the whole mass turned no fewer than 2 times dry; then sufficient clean water shall be added, evenly distributed, and the whole mass again turned no fewer than 3 times, not including placing in the carriers or forms.

90-6.06 AMOUNT OF WATER AND PENETRATION

- The amount of water used in concrete mixes shall be regulated so that the penetration of the concrete as determined by California Test 533 or the slump of the concrete as determined by ASTM Designation: C 143 is within the "Nominal" values shown in the following table. When the penetration or slump of the concrete is found to exceed the nominal values listed, the mixture of subsequent batches shall be adjusted to reduce the penetration or slump to a value within the nominal range shown. Batches of concrete with a penetration or slump exceeding the maximum values listed shall not be used in the work. When Type F or Type G chemical admixtures are added to the mix, the penetration requirements shall not apply and the slump shall not exceed 9" after the chemical admixtures are added.

Type of Work	Nominal		Maximum	
	Penetration (in)	Slump (in)	Penetration (in)	Slump (in)
Concrete Pavement	0-1	—	1.57	—
Non-reinforced concrete facilities	0-1 3/8	—	2	—
Reinforced concrete structures				
Sections over 12 inches thick	0-1 3/8	—	2.56	—
Sections 12 inches thick or less	0-2	—	3	—
Concrete placed under water	—	6"-8	—	9
Cast-in-place concrete piles	2.56-3.54	5.12-7.09	4	8

- The amount of free water used in concrete shall not exceed 308 pounds/yd³, plus 20 pounds for each required 100 pounds of cementitious material in excess of 548 pounds/yd³.
- The term free water is defined as the total water in the mixture minus the water absorbed by the aggregates in reaching a saturated surface-dry condition.
- Where there are adverse or difficult conditions that affect the placing of concrete, the above specified penetration and free water content limitations may be exceeded providing the Contractor is granted permission by the Engineer in writing to increase the cementitious material content per cubic yard of concrete. The increase in water and cementitious material shall be at a ratio not to exceed 30 pounds of water per added 100 pounds of cementitious material per cubic yard. The cost of additional cementitious material and water added under these conditions shall be at the Contractor's expense and no additional compensation will be allowed therefor.
- The equipment for supplying water to the mixer shall be constructed and arranged so that the amount of water added can be measured accurately. Any method of discharging water into the mixer for a batch shall be accurate within 1.5 percent of the quantity of water required to be added to the mix for any position of the mixer. Tanks used to measure water shall be designed so that water cannot enter while water is being discharged into the mixer and discharge into the mixer shall be made

rapidly in one operation without dribbling. All equipment shall be arranged so as to permit checking the amount of water delivered by discharging into measured containers.

90-7 CURING CONCRETE

90-7.01 METHODS OF CURING

- Newly placed concrete shall be cured by the methods specified in this Section 90-7.01 and the special provisions.

90-7.01A Water Method

- The concrete shall be kept continuously wet by the application of water for a minimum curing period of 7 days after the concrete has been placed.
- When a curing medium consisting of cotton mats, rugs, carpets, or earth or sand blankets is to be used to retain the moisture, the entire surface of the concrete shall be kept damp by applying water with a nozzle that so atomizes the flow that a mist and not a spray is formed, until the surface of the concrete is covered with the curing medium. The moisture from the nozzle shall not be applied under pressure directly upon the concrete and shall not be allowed to accumulate on the concrete in a quantity sufficient to cause a flow or wash the surface. At the expiration of the curing period, the concrete surfaces shall be cleared of all curing mediums.
- When concrete bridge decks and flat slabs are to be cured without the use of a curing medium, the entire surface of the bridge deck or slab shall be kept damp by the application of water with an atomizing nozzle as specified in the preceding paragraph, until the concrete has set, after which the entire surface of the concrete shall be sprinkled continuously with water for a period of not less than 7 days.

90-7.01B Curing Compound Method

- Surfaces of the concrete that are exposed to the air shall be sprayed uniformly with a curing compound.
- Curing compounds to be used shall be as follows:
 1. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class B, except the resin type shall be poly-alpha-methylstyrene.
 2. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class B.
 3. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class A.
 4. Non-pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 1, Class B.
 5. Non-pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 1, Class A.
 6. Non-pigmented curing compound with fugitive dye conforming to the requirements in ASTM Designation: C 309, Type 1-D, Class A.
- The infrared scan for the dried vehicle from curing compound (1) shall match the infrared scan on file at the Transportation Laboratory.
- The loss of water for each type of curing compound, when tested in conformance with the requirements in California Test 534, shall not be more than 0.28-pound/yd² in 24 hours or more than 0.83-pound/yd² in 72 hours.
- The curing compound to be used will be specified elsewhere in these specifications or in the special provisions.
- When the use of curing compound is required or permitted elsewhere in these specifications or in the special provisions and no specific kind is specified, any of the curing compounds listed above may be used.
- Curing compound shall be applied at a nominal rate of 4.2 yd²/quart, unless otherwise specified.
- At any point, the application rate shall be within ± 1.4 yd²/quart of the nominal rate specified, and the average application rate shall be within ± 0.6 yd²/quart of the nominal rate specified when tested in conformance with the requirements in California Test 535. Runs, sags, thin areas, skips, or holidays in the applied curing compound shall be evidence that the application is not satisfactory.
- Curing compounds shall be applied using power operated spray equipment. The power operated spraying equipment shall be equipped with an operational pressure gage and a means of controlling the pressure. Hand spraying of small and irregular areas that are not reasonably accessible to mechanical spraying equipment, in the opinion of the Engineer, may be permitted.
- The curing compound shall be applied to the concrete following the surface finishing operation, immediately before the moisture sheen disappears from the surface, but before any drying shrinkage or craze cracks begin to appear. In the event of any drying or cracking of the surface, application of water with an atomizing nozzle as specified in Section 90-7.01A, "Water Method," shall be started immediately and shall be continued until application of the compound is resumed or started; however, the compound shall not be applied over any resulting freestanding water. Should the film of compound be

damaged from any cause before the expiration of 7 days after the concrete is placed in the case of structures and 72 hours in the case of pavement, the damaged portion shall be repaired immediately with additional compound.

- At the time of use, compounds containing pigments shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. A paddle shall be used to loosen all settled pigment from the bottom of the container, and a power driven agitator shall be used to disperse the pigment uniformly throughout the vehicle.

- Agitation shall not introduce air or other foreign substance into the curing compound.

- The manufacturer shall include in the curing compound the necessary additives for control of sagging, pigment settling, leveling, de-emulsification, or other requisite qualities of a satisfactory working material. Pigmented curing compounds shall be manufactured so that the pigment does not settle badly, does not cake or thicken in the container, and does not become granular or curdled. Settlement of pigment shall be a thoroughly wetted, soft, mushy mass permitting the complete and easy vertical penetration of a paddle. Settled pigment shall be easily redispersed, with minimum resistance to the sideways manual motion of the paddle across the bottom of the container, to form a smooth uniform product of the proper consistency.

- Curing compounds shall remain sprayable at temperatures above 39° F and shall not be diluted or altered after manufacture.

- The curing compound shall be packaged in clean 22.6 gallon barrels or round 5 gallon containers or shall be supplied from a suitable storage tank located at the jobsite. The containers shall comply with "Title 49, Code of Federal Regulations, Hazardous Materials Regulations." The 22.6 gallon barrels shall have removable lids and airtight fasteners. The 5 gallon containers shall be round and have standard full open head and bail. Lids with bungholes shall not be permitted. On-site storage tanks shall be kept clean and free of contaminants. Each tank shall have a permanent system designed to completely redisperse settled material without introducing air or other foreign substances.

- Steel containers and lids shall be lined with a coating that will prevent destructive action by the compound or chemical agents in the air space above the compound. The coating shall not come off the container or lid as skins. Containers shall be filled in a manner that will prevent skinning. Plastic containers shall not react with the compound.

- Each container shall be labeled with the manufacturer's name, kind of curing compound, batch number, volume, date of manufacture, and volatile organic compound (VOC) content. The label shall also warn that the curing compound containing pigment shall be well stirred before use. Precautions concerning the handling and the application of curing compound shall be shown on the label of the curing compound containers in conformance with the Construction Safety Orders and General Industry Safety Orders of the State of California.

- Containers of curing compound shall be labeled to indicate that the contents fully comply with the rules and regulations concerning air pollution control in the State of California.

- When the curing compound is shipped in tanks or tank trucks, a shipping invoice shall accompany each load. The invoice shall contain the same information as that required herein for container labels.

- Curing compound will be sampled by the Engineer at the source of supply or at the jobsite or at both locations.

- Curing compound shall be formulated so as to maintain the specified properties for a minimum of one year. The Engineer may require additional testing before use to determine compliance with these specifications if the compound has not been used within one year or whenever the Engineer has reason to believe the compound is no longer satisfactory.

- Tests will be conducted in conformance with the latest ASTM test methods and methods in use by the Transportation Laboratory.

90-7.01C Waterproof Membrane Method

- The exposed finished surfaces of concrete shall be sprayed with water, using a nozzle that so atomizes the flow that a mist and not a spray is formed, until the concrete has set, after which the curing membrane shall be placed. The curing membrane shall remain in place for a period of not less than 72 hours.

- Sheeting material for curing concrete shall conform to the requirements in AASHTO Designation: M 171 for white reflective materials.

- The sheeting material shall be fabricated into sheets of such width as to provide a complete cover for the entire concrete surface. Joints in the sheets shall be securely cemented together in such a manner as to provide a waterproof joint. The joint seams shall have a minimum lap of 4".

- The sheets shall be securely weighted down by placing a bank of earth on the edges of the sheets or by other means satisfactory to the Engineer.

- Should any portion of the sheets be broken or damaged before the expiration of 72 hours after being placed, the broken or damaged portions shall be immediately repaired with new sheets properly cemented into place.

- Sections of membrane that have lost their waterproof qualities or have been damaged to such an extent as to render them unfit for curing the concrete shall not be used.

90-7.01D Forms-In-Place Method

- Formed surfaces of concrete may be cured by retaining the forms in place. The forms shall remain in place for a minimum period of 7 days after the concrete has been placed, except that for members over 1.64 feet in least dimension the forms shall remain in place for a minimum period of 5 days.
- Joints in the forms and the joints between the end of forms and concrete shall be kept moisture tight during the curing period. Cracks in the forms and cracks between the forms and the concrete shall be resealed by methods subject to the approval of the Engineer.

90-7.02 CURING PAVEMENT

- The entire exposed area of the pavement, including edges, shall be cured by the waterproof membrane method, or curing compound method using curing compound (1) or (2) as the Contractor may elect. Should the side forms be removed before the expiration of 72 hours following the start of curing, the exposed pavement edges shall also be cured. If the pavement is cured by means of the curing compound method, the sawcut and all portions of the curing compound that have been disturbed by sawing operations shall be restored by spraying with additional curing compound.
- Curing shall commence as soon as the finishing process provided in Section 40-1.10, "Final Finishing," has been completed. The method selected shall conform to the provisions in Section 90-7.01, "Methods of Curing."
- When the curing compound method is used, the compound shall be applied to the entire pavement surface by mechanical sprayers. Spraying equipment shall be of the fully atomizing type equipped with a tank agitator that provides for continual agitation of the curing compound during the time of application. The spray shall be adequately protected against wind, and the nozzles shall be so oriented or moved mechanically transversely as to result in the minimum specified rate of coverage being applied uniformly on exposed faces. Hand spraying of small and irregular areas, and areas inaccessible to mechanical spraying equipment, in the opinion of the Engineer, will be permitted. When the ambient air temperature is above 59°F, the Contractor shall fog the surface of the concrete with a fine spray of water as specified in Section 90-7.01A, "Water Method." The surface of the pavement shall be kept moist between the hours of 10:00 a.m. and 4:30 p.m. on the day the concrete is placed. However, the fogging done after the curing compound has been applied shall not begin until the compound has set sufficiently to prevent displacement. Fogging shall be discontinued if ordered in writing by the Engineer.

90-7.03 CURING STRUCTURES

- Newly placed concrete for cast-in-place structures, other than highway bridge decks, shall be cured by the water method, the forms-in-place method, or, as permitted herein, by the curing compound method, in conformance with the provisions in Section 90-7.01, "Methods of Curing."
- The curing compound method using a pigmented curing compound may be used on concrete surfaces of construction joints, surfaces that are to be buried underground, and surfaces where only Ordinary Surface Finish is to be applied and on which a uniform color is not required and that will not be visible from a public traveled way. If the Contractor elects to use the curing compound method on the bottom slab of box girder spans, the curing compound shall be curing compound (1).
- The top surface of highway bridge decks shall be cured by both the curing compound method and the water method. The curing compound shall be curing compound (1). The curing compound shall be applied progressively during the deck finishing operations immediately after finishing operations are completed on each individual portion of the deck. The water cure shall be applied not later than 4 hours after completion of deck finishing or, for portions of the decks on which finishing is completed after normal working hours, the water cure shall be applied not later than the following morning.
- Concrete surfaces of minor structures, as defined in Section 51-1.02, "Minor Structures," shall be cured by the water method, the forms-in-place method or the curing compound method.
- When deemed necessary by the Engineer during periods of hot weather, water shall be applied to concrete surfaces being cured by the curing compound method or by the forms-in-place method, until the Engineer determines that a cooling effect is no longer required. Application of water for this purpose will be paid for as extra work as provided in Section 4-1.03D, "Extra Work."

90-7.04 CURING PRECAST CONCRETE MEMBERS

- Precast concrete members shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing." Curing shall be provided for the minimum time specified for each method or until the concrete reaches its design strength, whichever is less. Steam curing may also be used for precast members and shall conform to the following provisions:
 - A. After placement of the concrete, members shall be held for a minimum 4-hour presteaming period. If the ambient air temperature is below 10°C, steam shall be applied during the presteaming period to hold the air surrounding the member at a temperature between 50° F and 90° F.

- B. To prevent moisture loss on exposed surfaces during the presteaming period, members shall be covered as soon as possible after casting or the exposed surfaces shall be kept wet by fog spray or wet blankets.
- C. Enclosures for steam curing shall allow free circulation of steam about the member and shall be constructed to contain the live steam with a minimum moisture loss. The use of tarpaulins or similar flexible covers will be permitted, provided they are kept in good repair and secured in such a manner as to prevent the loss of steam and moisture.
- D. Steam at the jets shall be at low pressure and in a saturated condition. Steam jets shall not impinge directly on the concrete, test cylinders, or forms. During application of the steam, the temperature rise within the enclosure shall not exceed 72° F per hour. The curing temperature throughout the enclosure shall not exceed 149° F and shall be maintained at a constant level for a sufficient time necessary to develop the required transfer strength. Control cylinders shall be covered to prevent moisture loss and shall be placed in a location where temperature is representative of the average temperature of the enclosure.
- E. Temperature recording devices that will provide an accurate, continuous, permanent record of the curing temperature shall be provided. A minimum of one temperature recording device per 197 feet of continuous bed length will be required for checking temperature.
- F. Members in pretension beds shall be detensioned immediately after the termination of steam curing while the concrete and forms are still warm, or the temperature under the enclosure shall be maintained above 59° F until the stress is transferred to the concrete.
- G. Curing of precast concrete will be considered completed after termination of the steam curing cycle.

90-7.05 CURING PRECAST PRESTRESSED CONCRETE PILES

- Newly placed concrete for precast prestressed concrete piles shall be cured in conformance with the provisions in Section 90-7.04, "Curing Precast Concrete Members," except that piles with a class designation ending in C (corrosion resistant) shall be cured as follows:

- A. Piles shall be either steam cured or water cured. If water curing is used, the piles shall be kept continuously wet by the application of water in conformance with the provisions in Section 90-7.01A, "Water Method."
- B. If steam curing is used, the steam curing provisions in Section 90-7.04, "Curing Precast Concrete Members," shall apply except that the piles shall be kept continuously wet for their entire length for a period of not less than 3 days, including the holding and steam curing periods.

90-7.06 CURING SLOPE PROTECTION

- Concrete slope protection shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing."
- Concreted-rock slope protection shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing," or with a blanket of earth kept wet for 72 hours, or by sprinkling with a fine spray of water every 2 hours during the daytime for a period of 3 days.

90-7.07 CURING MISCELLANEOUS CONCRETE WORK

- Exposed surfaces of curbs shall be cured by pigmented curing compounds as specified in Section 90-7.01B, "Curing Compound Method."
- Concrete sidewalks, gutter depressions, island paving, curb ramps, driveways, and other miscellaneous concrete areas shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing."
- Shotcrete shall be cured for at least 72 hours by spraying with water, or by a moist earth blanket, or by any of the methods provided in Section 90-7.01, "Methods of Curing."
- Mortar and grout shall be cured by keeping the surface damp for 3 days.
- After placing, the exposed surfaces of sign structure foundations, including pedestal portions, if constructed, shall be cured for at least 72 hours by spraying with water, or by a moist earth blanket, or by any of the methods provided in Section 90-7.01, "Methods of Curing."

90-8 PROTECTING CONCRETE

90-8.01 GENERAL

- In addition to the provisions in Section 7-1.16, "Contractor's Responsibility for the Work and Materials," the Contractor shall protect concrete as provided in this Section 90-8.

- Concrete shall not be placed on frozen or ice-coated ground or subgrade nor on ice-coated forms, reinforcing steel, structural steel, conduits, precast members, or construction joints.
- Under rainy conditions, placing of concrete shall be stopped before the quantity of surface water is sufficient to damage surface mortar or cause a flow or wash of the concrete surface, unless the Contractor provides adequate protection against damage.
- Concrete that has been frozen or damaged by other causes, as determined by the Engineer, shall be removed and replaced by the Contractor at the Contractor's expense.

90-8.02 PROTECTING CONCRETE STRUCTURES

- Structure concrete and shotcrete used as structure concrete shall be maintained at a temperature of not less than 45° F for 72 hours after placing and at not less than 39° F for an additional 4 days. When required by the Engineer, the Contractor shall submit a written outline of the proposed methods for protecting the concrete.

90-8.03 PROTECTING CONCRETE PAVEMENT

- Pavement concrete shall be maintained at a temperature of not less than 39° F for 72 hours. When required by the Engineer, the Contractor shall submit a written outline of the proposed methods for protecting the concrete.
- Except as provided in Section 7-1.08, "Public Convenience," the Contractor shall protect concrete pavement against construction and other activities that abrade, scar, discolor, reduce texture depth, lower coefficient of friction, or otherwise damage the surface. Stockpiling, drifting, or excessive spillage of soil, gravel, petroleum products, and concrete or asphalt mixes on the surface of concrete pavement is prohibited unless otherwise specified in these specifications, the special provisions or permitted by the Engineer.
- When ordered by the Engineer or shown on the plans or specified in the special provisions, pavement crossings shall be constructed for the convenience of public traffic. The material and work necessary for the construction of the crossings, and their subsequent removal and disposal, will be paid for at the contract unit prices for the items of work involved and if there are no contract items for the work involved, payment for pavement crossings will be made by extra work as provided in Section 4-1.03D, "Extra Work.". Where public traffic will be required to cross over the new pavement, Type III portland cement may be used in concrete, if permitted in writing by the Engineer. The pavement may be opened to traffic as soon as the concrete has developed a modulus of rupture of 551 psi. The modulus of rupture will be determined by California Test 523.
- No traffic or Contractor's equipment, except as hereinafter provided, will be permitted on the pavement before a period of 10 days has elapsed after the concrete has been placed, nor before the concrete has developed a modulus of rupture of at least 551 psi. Concrete that fails to attain a modulus of rupture of 551 psi within 10 days shall not be opened to traffic until directed by the Engineer.
- Equipment for sawing weakened plane joints will be permitted on the pavement as specified in Section 40-1.08B, "Weakened Plane Joints."
- When requested in writing by the Contractor, the tracks on one side of paving equipment will be permitted on the pavement after a modulus of rupture of 348 psi has been attained, provided that:
 - A. Unit pressure exerted on the pavement by the paver shall not exceed 19.6 psi;
 - B. Tracks with cleats, grousers, or similar protuberances shall be modified or shall travel on planks or equivalent protective material, so that the pavement is not damaged; and
 - C. No part of the track shall be closer than one foot from the edge of pavement.
- In case of visible cracking of, or other damage to the pavement, operation of the paving equipment on the pavement shall be immediately discontinued.
- Damage to the pavement resulting from early use of pavement by the Contractor's equipment as provided above shall be repaired by the Contractor at the Contractor's expense.
- The State will furnish the molds and machines for testing the concrete for modulus of rupture, and the Contractor, at the Contractor's expense, shall furnish the material and whatever labor the Engineer may require.

90-9 COMPRESSIVE STRENGTH

90-9.01 GENERAL

- Concrete compressive strength requirements consist of a minimum strength that shall be attained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days or at the age otherwise allowed in Section 90-1.01, "Description." The various strengths required are specified in these specifications or the special provisions or are shown on the plans.

- The compressive strength of concrete will be determined from test cylinders that have been fabricated from concrete sampled in conformance with the requirements of ASTM Designation: C 172. Test cylinders will be molded and initially field cured in conformance with California Test 540. Test cylinders will be cured and tested after receipt at the testing laboratory in conformance with the requirements of ASTM Designation: C 39. A strength test shall consist of the average strength of 2 cylinders fabricated from material taken from a single load of concrete, except that, if any cylinder should show evidence of improper sampling, molding, or testing, that cylinder shall be discarded and the strength test shall consist of the strength of the remaining cylinder.

- When concrete compressive strength is specified as a prerequisite to applying loads or stresses to a concrete structure or member, test cylinders for other than steam cured concrete will be cured in conformance with Method 1 of California Test 540. The compressive strength of concrete determined for these purposes will be evaluated on the basis of individual tests.

- When concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete strength to be used as a basis for acceptance of other than steam cured concrete will be determined from cylinders cured in conformance with Method 1 of California Test 540. If the result of a single compressive strength test at the maximum age specified or allowed is below the specified strength but is 95 percent or more of the specified strength, the Contractor shall, at the Contractor's expense, make corrective changes, subject to approval of the Engineer, in the mix proportions or in the concrete fabrication procedures, before placing additional concrete, and shall pay to the State \$10.70 for each in-place cubic yard of concrete represented by the deficient test. If the result of a single compressive strength test at the maximum age specified or allowed is below 95 percent of the specified strength, but is 85 percent or more of the specified strength, the Contractor shall make the corrective changes specified above, and shall pay to the State \$15.29 for each in place cubic yard of concrete represented by the deficient test. In addition, such corrective changes shall be made when the compressive strength of concrete tested at 7 days indicates, in the judgment of the Engineer, that the concrete will not attain the required compressive strength at the maximum age specified or allowed. Concrete represented by a single test that indicates a compressive strength of less than 85 percent of the specified 28-day compressive strength will be rejected in conformance with the provisions in Section 6-1.04, "Defective Materials."

- If the test result indicates that the compressive strength at the maximum curing age specified or allowed is below the specified strength, but is 85 percent or more of the specified strength, payments to the State as required above shall be made, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength of the concrete placed in the work meets or exceeds the specified 28-day compressive strength. If the test result indicates a compressive strength at the maximum curing age specified or allowed below 85 percent, the concrete represented by that test will be rejected, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength and quality of the concrete placed in the work are acceptable. If the evidence consists of tests made on cores taken from the work, the cores shall be obtained and tested in conformance with the requirements in ASTM Designation: C 42.

- No single compressive strength test shall represent more than 327 yd³.

- When a precast concrete member is steam cured, the compressive strength of the concrete will be determined from test cylinders that have been handled and stored in conformance with Method 3 of California Test 540. The compressive strength of steam cured concrete will be evaluated on the basis of individual tests representing specific portions of production. When the concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete shall be considered to be acceptable whenever its compressive strength reaches the specified 28-day compressive strength provided that strength is reached in not more than the maximum number of days specified or allowed after the member is cast.

- When concrete is specified by compressive strength, prequalification of materials, mix proportions, mixing equipment, and procedures proposed for use will be required prior to placement of the concrete. Prequalification shall be accomplished by the submission of acceptable certified test data or trial batch reports by the Contractor. Prequalification data shall be based on the use of materials, mix proportions, mixing equipment, procedures, and size of batch proposed for use in the work.

- Certified test data, in order to be acceptable, shall indicate that not less than 90 percent of at least 20 consecutive tests exceed the specified strength at the maximum number of cure days specified or allowed, and none of those tests are less

than 95 percent of specified strength. Strength tests included in the data shall be the most recent tests made on concrete of the proposed mix design and all shall have been made within one year of the proposed use of the concrete.

- Trial batch test reports, in order to be acceptable, shall indicate that the average compressive strength of 5 consecutive concrete cylinders, taken from a single batch, at not more than 28 days (or the maximum age allowed) after molding shall be at least 580 psi greater than the specified 28-day compressive strength, and no individual cylinder shall have a strength less than the specified strength at the maximum age specified or allowed. Data contained in the report shall be from trial batches that were produced within one year of the proposed use of specified strength concrete in the project. Whenever air-entrainment is required, the air content of trial batches shall be equal to or greater than the air content specified for the concrete without reduction due to tolerances.

- Tests shall be performed in conformance with either the appropriate California Test methods or the comparable ASTM test methods. Equipment employed in testing shall be in good condition and shall be properly calibrated. If the tests are performed during the life of the contract, the Engineer shall be notified sufficiently in advance of performing the tests in order to witness the test procedures.

- The certified test data and trial batch test reports shall include the following information:

- A. Date of mixing.
- B. Mixing equipment and procedures used.
- C. The size of batch in cubic yard and the weight, type, and source of all ingredients used.
- D. Penetration of the concrete.
- E. The air content of the concrete if an air-entraining admixture is used.
- F. The age at time of testing and strength of all concrete cylinders tested.

- Certified test data and trial batch test reports shall be signed by an official of the firm that performed the tests.

- When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower quality is required and the concrete will be paid for as the type or class of concrete required at that location.

- After materials, mix proportions, mixing equipment, and procedures for concrete have been prequalified for use, additional prequalification by testing of trial batches will be required prior to making changes that, in the judgment of the Engineer, could result in a strength of concrete below that specified.

- The Contractor's attention is directed to the time required to test trial batches and the Contractor shall be responsible for production of trial batches at a sufficiently early date so that the progress of the work is not delayed.

- When precast concrete members are manufactured at the plant of an established manufacturer of precast concrete members, the mix proportions of the concrete shall be determined by the Contractor, and a trial batch and prequalification of the materials, mix proportions, mixing equipment, and procedures will not be required.

90-10 MINOR CONCRETE

90-10.01 GENERAL

- Concrete for minor structures, slope paving, curbs, sidewalks and other concrete work, when designated as minor concrete on the plans, in the specifications, or in the contract item, shall conform to the provisions specified herein.

- The Engineer, at the Engineer's discretion, will inspect and test the facilities, materials and methods for producing the concrete to ensure that minor concrete of the quality suitable for use in the work is obtained.

90-10.02 MATERIALS

- Minor concrete shall conform to the following requirements:

90-10.02A Cementitious Material

- Cementitious material shall conform to the provisions in Section 90-1.01, "Description."

90-10.02B Aggregate

- Aggregate shall be clean and free from deleterious coatings, clay balls, roots, and other extraneous materials.

- The Contractor shall submit to the Engineer for approval, a grading of the combined aggregate proposed for use in the minor concrete. After acceptance of the grading, aggregate furnished for minor concrete shall conform to that grading, unless a change is authorized in writing by the Engineer.

- The Engineer may require the Contractor to furnish periodic test reports of the aggregate grading furnished. The maximum size of aggregate used shall be at the option of the Contractor, but in no case shall the maximum size be larger than 1 1/2" or smaller than 3/4".

- The Engineer may waive, in writing, the gradation requirements in this Section 90-10.02B, if, in the Engineer's opinion, the furnishing of the gradation is not necessary for the type or amount of concrete work to be constructed.

90-10.02C Water

- Water used for washing, mixing, and curing shall be free from oil, salts, and other impurities that would discolor or etch the surface or have an adverse affect on the quality of the concrete.

90-10.02D Admixtures

- The use of admixtures shall conform to the provisions in Section 90-4, "Admixtures."

90-10.03 PRODUCTION

- Cementitious material, water, aggregate, and admixtures shall be stored, proportioned, mixed, transported, and discharged in conformance with recognized standards of good practice that will result in concrete that is thoroughly and uniformly mixed, that is suitable for the use intended, and that conforms to requirements specified herein. Recognized standards of good practice are outlined in various industry publications such as are issued by American Concrete Institute, AASHTO, or the Department.

- The cementitious material content of minor concrete shall conform to the provisions in Section 90-1.01, "Description."

- The amount of water used shall result in a consistency of concrete conforming to the provisions in Section 90-6.06, "Amount of Water and Penetration." Additional mixing water shall not be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer.

- Discharge of ready-mixed concrete from the transporting vehicle shall be made while the concrete is still plastic and before stiffening occurs. An elapsed time of 1.5 hours (one hour in non-agitating hauling equipment), or more than 250 revolutions of the drum or blades, after the introduction of the cementitious material to the aggregates, or a temperature of concrete of more than 90° F will be considered conditions contributing to the quick stiffening of concrete. The Contractor shall take whatever action is necessary to eliminate quick stiffening, except that the addition of water will not be permitted.

- The required mixing time in stationary mixers shall be not less than 50 seconds or more than 5 minutes.

- The minimum required revolutions at mixing speed for transit-mixed concrete shall be not less than that recommended by the mixer manufacturer, and shall be increased, if necessary, to produce thoroughly and uniformly mixed concrete.

- Each load of ready-mixed concrete shall be accompanied by a weighmaster certificate that shall be delivered to the Engineer at the discharge location of the concrete, unless otherwise directed by the Engineer. The weighmaster certificate shall be clearly marked with the date and time of day when the load left the batching plant and, if hauled in truck mixers or agitators, the time the mixing cycle started.

- A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished to the Engineer, prior to placing minor concrete from a source not previously used on the contract, stating that minor concrete to be furnished meets contract requirements, including minimum cementitious material content specified.

90-10.04 CURING MINOR CONCRETE

- Curing minor concrete shall conform to the provisions in Section 90-7, "Curing Concrete."

90-10.05 PROTECTING MINOR CONCRETE

- Protecting minor concrete shall conform to the provisions in Section 90-8, "Protecting Concrete," except the concrete shall be maintained at a temperature of not less than 39° F for 72 hours after placing.

90-10.06 MEASUREMENT AND PAYMENT

- Minor concrete will be measured and paid for in conformance with the provisions specified in the various sections of these specifications covering concrete construction when minor concrete is specified in the specifications, shown on the plans, or indicated by contract item in the Engineer's Estimate.

90-11 MEASUREMENT AND PAYMENT

90-11.01 MEASUREMENT

- Portland cement concrete will be measured in conformance with the provisions specified in the various sections of these specifications covering construction requiring concrete.

- When it is provided that concrete will be measured at the mixer, the volume in cubic yards shall be computed as the total weight of the batch in pounds divided by the density of the concrete in pounds per cubic yard. The total weight of the batch shall be calculated as the sum of all materials, including water, entering the batch. The density of the concrete will be determined in conformance with the requirements in California Test 518.

90-11.02 PAYMENT

- Portland cement concrete will be paid for in conformance with the provisions specified in the various sections of these specifications covering construction requiring concrete.
- Full compensation for furnishing and incorporating admixtures required by these specifications or the special provisions will be considered as included in the contract prices paid for the concrete involved and no additional compensation will be allowed therefor.
- Should the Engineer order the Contractor to incorporate any admixtures in the concrete when their use is not required by these specifications or the special provisions, furnishing the admixtures and adding them to the concrete will be paid for as extra work as provided in Section 4-1.03D, "Extra Work."
- Should the Contractor use admixtures in conformance with the provisions in Section 90-4.05, "Optional Use of Chemical Admixtures," or Section 90-4.07, "Optional Use of Air-entraining Admixtures," or should the Contractor request and obtain permission to use other admixtures for the Contractor's benefit, the Contractor shall furnish those admixtures and incorporate them into the concrete at the Contractor's expense and no additional compensation will be allowed therefor.

SECTION 12. (BLANK)

SECTION 13: RAILROAD RELATIONS AND INSURANCE REQUIREMENTS

SECTION 13-1: RELATIONS WITH RAILROAD COMPANY (UNION PACIFIC RAILROAD COMPANY)

13-1.01 GENERAL

The term "Railroad" shall mean the Union Pacific Railroad Company.

It is expected that the Railroad will cooperate with the Contractor to the end that the work may be handled in an efficient manner. However, except for the additional compensation provided for hereinafter for delays in completion of specific unit of work to be performed by the Railroad, and except as provided in Public Contracts Code Section 7102, the Contractor shall have no claim for damages, extension of time, or extra compensation in the event his work is held up by work performed by the Railroad.

The Contractor must understand the Contractor's right to enter Railroad's property is subject to the absolute right of Railroad to cause the Contractor's work on Railroad's property to cease if, in the opinion of Railroad, Contractor's activities create a hazard to Railroad's property, employees, and operations.

The Contractor shall sign and submit to the Railroad the Contractor's Endorsement, in the form attached hereto.

13-1.02 RAILROAD REQUIREMENTS

The Contractor shall notify Mr. Freddy C. Cheung, Manager Industry and Public Projects, 19100 Slover Avenue, Bloomington, CA 92316, Telephone: (909) 879-6288 (FAX 909-879-6289) and the Engineer, in writing, at least 10 working days before performing any work on, or adjacent to the property or tracks of the Railroad.

The Contractor shall cooperate with the Railroad where work is over or under the tracks, or within the limits of Railroad property to expedite the work and avoid interference with the operation of railroad equipment.

The Contractor shall comply with the rules and regulations of Railroad or the instructions of its representatives in relation to protecting the tracks and property of Railroad and the traffic moving on such tracks, as well as the wires, signals and other property of Railroad, its tenants or licensees, at and in the vicinity of the work during the period of construction.

The Contractor shall perform work to not endanger or interfere with the safe operation of the tracks and property of Railroad and traffic moving on such tracks, as well as wires, signals and other property of Railroad, its tenants or licensees, at or in the vicinity of the work.

The Contractor shall take protective measures to keep railroad facilities, including track ballast, free of sand or debris resulting from his operations. Damage to railroad facilities resulting from Contractor's operations will be repaired or replaced by Railroad and the cost of such repairs or replacement shall be deducted from the Contractor's progress and final pay estimates.

The Contractor shall contact the Railroad's "Call Before You Dig" at least 48 hours prior to commencing work, at Telephone: (800) 336-9193 (a 24 hour number) to determine location of fiber optics. If a telecommunications system is buried anywhere on or near railroad property, the Contractor will coordinate with the Railroad and the Telecommunication Company(ies) to arrange for relocation or other protection of the system prior to beginning any work on or near Railroad Property.

The Contractor shall not pile or store any materials nor park any equipment closer than 25'-0" to the centerline of the nearest track, unless directed by Railroad's representative.

The Contractor shall also abide by the following temporary clearances during the course of construction:

12'-0" horizontally from centerline of track

21'-0" vertically above top of rail

The temporary vertical construction clearance above provided will not be permitted until authorized by the Public Utilities Commission. It is anticipated that authorization will be received not later than 15 days after the approval of the contract by the Attorney General. In the event authorization is not received by the time specified, and, if in the opinion of the Engineer, the Contractor's operations are delayed or interfered with by reason of authorization not being received by the said time, the State will compensate the Contractor for such delay to the extent provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications and not otherwise.

Walkways with railing shall be constructed by Contractor over open excavation areas when in close proximity of tracks, and railings shall not be closer than 8'-6" horizontally from centerline of the nearest track, if tangent, or 9'-6" if curved.

Infringement on the above temporary construction clearances by the Contractor's operations shall be submitted to the Railroad by the Engineer, and shall not be undertaken until approved by the Railroad, and until the Engineer has obtained any necessary authorization from any governmental body or bodies having jurisdiction thereover. No extension of time or extra compensation will be allowed in the event the Contractor's work is delayed pending Railroad approval and governmental authorization.

When the temporary vertical clearance is less than 22'-6" above top of rail, Railroad shall have the option of installing tell-tales or other protective devices Railroad deems necessary for protection of Railroad trainmen or rail traffic.

Four sets of plans, in 11" x 17" format, and two sets of calculations showing details of construction affecting the Railroad's tracks and property not included in the contract plans, including but not limited to shoring and falsework, shall be submitted to the Engineer for review prior to submittal to Railroad for final approval. Falsework shall comply with UPRR guidelines. Demolition of existing structures shall comply with UPRR guidelines. Shoring shall be designed in accordance with UPRR's shoring requirement of Drawing No. 106613 and guidelines for shoring and falsework, latest edition, issued by the Railroad's Office of Chief Engineer. Shoring and falsework plans and calculations shall be prepared and signed by a professional engineer registered in California. This work shall not be undertaken until such time as the Railroad has given such approval, review by Railroad may take up to 6 weeks after receipt of necessary information.

The Contractor shall notify the Engineer in writing, at least 25 calendar days but not more than 40 days in advance of the starting date of installing temporary work with less than permanent clearance at each structure site. The Contractor shall not be permitted to proceed with work across railroad tracks until this requirement has been met. No extension of time or extra compensation will be allowed if the Contractor's work is delayed due to failure to comply with the requirements in this paragraph.

Private crossings at grade over tracks of Railroad for the purpose of hauling earth, rock, paving or other materials will not be permitted. If the Contractor, for the purpose of constructing highway-railway grade separation structures, including construction ramps thereto, desires to move equipment or materials across Railroad's tracks, the Contractor shall first obtain permission from Railroad. Should Railroad approve the crossing, the Contractor shall execute a private crossing agreement. By this agreement, the Contractor shall bear the cost of the crossing surface, with warning devices that might be required. The Contractor shall furnish the Contractor's own employees as flagmen to control movements of vehicles on the private roadway and shall prevent the use of such roadway by unauthorized persons and vehicles.

Blasting will be permitted only when approved by the Railroad.

The Contractor shall, upon completion of the work covered by this contract to be performed by Contractor upon the premises or over or beneath the tracks of Railroad, promptly remove from the premises of Railroad, Contractor's tools, implements and other materials, whether brought upon said premises and cause said premises to be left in a clean and presentable condition.

Under track pipeline installations shall be constructed in accordance with Railroad's current standards which may be obtained from Railroad. The general guidelines are as follows:

Edges of jacking or boring pit excavations shall be a minimum of 20 feet from the centerline of the nearest track.

If the pipe to be installed under the track is 4 inches in diameter or less, the top of the pipe shall be at least 42 inches below base of rail.

If the pipe diameter is greater than 4 inches in diameter, it shall be encased and the top of the steel pipe casing shall be at least 66 inches below base of rail.

Installation of pipe or conduit under Railroad's tracks shall be done by dry bore and jack method.

Hydraulic jacking or boring will not be permitted.

13-1.03 PROTECTION OF RAILROAD FACILITIES

Upon advance notification of not less than 10 working days by the Contractor, Railroad representatives, conductors, flagmen or watchmen will be provided by Railroad to protect its facilities, property and movements of its trains or engines. Notice shall be made to Mr. Freddy C. Cheung of Railroad at Telephone: (909) 879-6288. At the time of notification, the Contractor shall provide Railroad with a schedule of dates that flagging services will be needed, as well as times, if outside normal working hours. Subsequent deviation from the schedule shall require 10 working days advance notice from the first affected date. The Railroad will furnish such personnel or other protective devices:

(a) When equipment is standing or being operated within 25 feet, measured horizontally, from centerline of any track on which trains may operate, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

(b) For any excavation below elevation of track subgrade if, in the opinion of Railroad's representative, track or other Railroad facilities may be subject to settlement or movement.

(c) During any clearing, grubbing, grading or blasting in proximity to Railroad which, in the opinion of Railroad's representative, may endanger Railroad facilities or operations.

(d) During any of Contractor's operations when, in the opinion of Railroad's representatives, Railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines or pipe lines, may be endangered.

The cost of flagging and inspection provided by Railroad during the period of constructing that portion of the project located on or near Railroad property, as deemed necessary for the protection of Railroad's facilities and trains, will be borne by the State for a period of 100 working days beginning on the date work commences on or near property of Railroad.

13-1.04 WORK BY RAILROAD

Railroad will furnish or cause to be furnished as necessary due to construction, labor materials, tools and equipment to perform certain works including relocation of telephone, telegraphy and signal lines and appurtenances and will perform any other work in connection therewith.

The following work by Railroad will be performed by Railroad forces and is not a part of the work under this contract.

The Railroad will perform preliminary engineering inspection and flagging as specified in Section 13-1.03 "Protection of Railroad Facilities," of these special provisions.

The railroad shall construct the track structure (rails, ties and ballast) for the shoofly.

13-1.05 DELAYS DUE TO WORK BY RAILROAD

A delay due to work by Railroad will be considered to occur whenever:

(a) The Contractor has provided the minimum required notice, as provided herein, as to the date his work, shall permit the Railroad to begin work on a specific unit of work listed in the following table, and

(b) The Railroad has not completed a specific unit of work within the number of performance days listed for that unit after the date or the date when the site was made available to the Railroad, whichever is later, and (c) In the opinion of the Engineer the Contractor's operations are delayed or interfered with by reason of the Railroad not completing the unit of work on time, and

(d) The Contractor has provided written notice to the Engineer that his operations are being delayed or interfered with by reason of the Railroad not completing the unit of work on time.

Unit of Work	Minimum Required Notice, Calendar Days	Performance Days
Construct and Remove shoofly	90	30

The Contractor shall notify the Engineer of the dates when the Contractor will have completed work necessary to permit the Railroad to begin work on the above unit of work. Such notice shall be provided, in writing, at least the number of days listed above under "Minimum required notice," in advance of said dates. If after providing said notice, it becomes apparent to the Contractor that work will not progress to the stage necessary to permit the Railroad to begin work on the scheduled date, the Contractor shall file a corrected notice with the Engineer. Should a corrected notice not be filed in sufficient time to prevent the Railroad from unnecessarily mobilizing men and equipment, including movement to the job site, related costs incurred by the Railroad for nonproductive work shall be borne by the Contractor and sums sufficient to cover the claims based upon bills rendered to the State by Railroad for such costs will be deducted from the progress and final pay estimates due to the Contractor.

A performance day is defined as any day on which the Railroad crew which is performing the unit of work would normally work except days on which the crew is prevented by inclement weather or conditions resulting immediately therefrom, as determined by the Engineer, from proceeding with at least 75 percent of the normal labor and equipment force for at least 60 percent of the total daily time currently spent on the unit of work.

If delays due to work by the Railroad occur, and the Contractor sustains loss which, in the opinion of the Engineer, could not have been avoided by the judicious handling of forces, equipment and plant, the amount of said loss shall be determined as provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

If a delay due to work by Railroad occurs, an extension of time determined pursuant to the provisions in Section 8-1.07, "Liquidated Damages," of the Standard Specifications will be granted.

13-1.06 LEGAL RELATIONS

The provisions of this section, "Relations with Railroad Company" and the provisions of the following section, "Railroad Protective Insurance," of these special provisions shall inure directly to the benefit of Railroad

SECTION 13-2. RAILROAD PROTECTIVE INSURANCE

The term "Railroad" shall be understood to mean the Union Pacific Railroad Company.

In addition to any other form of insurance or bonds required under the terms of the contract and specifications, the Contractor will be required to carry insurance of the kinds and in the amounts hereinafter specified.

Such insurance shall be approved by the Railroad before any work is performed on Railroad's property and shall be carried until all work required to be performed on or adjacent to the Railroad's property under the terms of the contract is satisfactorily completed as determined by the Engineer, and thereafter until all tools, equipment and materials have been removed from Railroad's property and such property is left in a clean and presentable condition.

The insurance herein required shall be obtained by the Contractor, who shall furnish the Railroad with completed certificates, in the form attached hereto, signed by the insurance company or its authorized agent or representative, reflecting the existence of each of the policies required by 1 and 2 below including coverage for X, C and U and completed operations hazards, and the original policy of insurance (or a certified duplicate original policy) required by 3 below, to:

Judy Scott
Union Pacific Railroad Company
Insurance Group
1416 Dodge Street, Room 820
Omaha, NE 68179

Certificate of insurance shall guarantee that the policy under 1 and 2 will not be amended, altered, modified or canceled insofar as the coverage contemplated hereunder is concerned, without at least thirty (30) days notice mailed by registered mail to the Railroad.

Full compensation for all premiums which the Contractor is required to pay on all the insurance described hereinafter shall be considered as included in the prices paid for the various items of work to be performed under the contract, and no additional allowance will be made therefor or for additional premiums which may be required by extensions of the policies of insurance.

The approximate ratio of the estimated cost of the work over or under or within 50 feet of Railroad's tracks to the total estimated cost is 0.10. Approximate daily train traffic is 30 passenger trains and 20 freight trains.

1. Contractor's Public Liability and Property Damage Liability Insurance

The Contractor shall, with respect to the operations he performs within or adjacent to Railroad's property, carry regular Contractor's Public Liability and Property Damage Liability Insurance providing for the same limits as specified for Railroad's Protective Public Liability and Property Damage Liability insurance to be furnished for and in behalf of Railroad as hereinafter provided.

If any part of the work within or adjacent to Railroad's property is subcontracted, the Contractor in addition to carrying the above insurance shall provide the above insurance on behalf of the subcontractors to cover their operations.

2. Contractor's Protective Public Liability and Property Damage Liability Insurance.

The Contractor shall, with respect to the operations performed for him by subcontractors who do work within or adjacent to Railroad's property, carry in his own behalf regular Contractor's Protective Public Liability and Property Damage Liability Insurance providing for the same limits as specified for Railroad's Protective Public Liability and Property Damage Liability Insurance to be furnished for and on behalf of Railroad as hereinafter provided.

3. Railroad's Protective Public Liability and Property Damage Liability Insurance

The Contractor shall, with respect to the operations he performs within or adjacent to Railroad's property or that of any of his subcontractors who do work within or adjacent to Railroad's property perform, have issued and furnished in favor of Railroad, Policy or policies of insurance in the Railroad Protective Liability Form as hereinafter specified.

Railroad Protective Liability Form

(Name of Insurance Company)

DECLARATIONS

Item 1. Named Insured:

Union Pacific Railroad Company
1416 Dodge Street - Mail Code 10049
Omaha, Nebraska 68179

Item 2. Policy Period: From _____ to _____ 12:01 a.m., Standard Time, at the designated job site as stated herein.

Item 3. The insurance afforded is only with respect to such of the following coverage's as are indicated in Item 6 by specific premium charge or charges. The limit of the company's liability against such coverage or coverage's shall be as stated herein, subject to all the terms of this policy having reference thereto.

		Limits of Liability	
Coverage's		Each Occurrence	Aggregate
A B & C	Bodily Injury Liability Property Damage Liability and Physical Damage to Property	\$2,000,000 Combined Single Limit	\$6,000,000 for Coverage's A, B & C

Item 4. Name and Address of Contractor:

Item 5. Name and Address of Governmental Authority for whom the work by the Contractor is being performed: State of California, acting by and through its Department of Transportation, P.O. Box 942874, Sacramento, California 94274-0001

Item 6. Designation of the Job Site and Description of Work:

FOR CONSTRUCTION ON _____

Premium	Rates per \$100 of Cost		Advance Premiums	
Bases	Coverage A	Coverage's B & C	Coverage A	Coverage's B & C
Contract Cost	\$	\$	\$	\$
Rental Cost	\$	\$	\$	\$

Countersigned _____, 20____ by _____

Title

POLICY

(Name of Insurance Company)

A _____ insurance company, herein called the company, agrees with the insured, named in the declarations made a part hereof, in consideration of the payment of the premium and in reliance upon the statements in the declaration made by the named insured and subject to all of the terms of this policy:

INSURING AGREEMENTS

I. Coverage A--Bodily Injury Liability.

To pay on behalf of the insured all sums which the insured shall become legally obligated to pay as damages because of bodily injury, sickness, or disease, including death at any time resulting therefrom, hereinafter called "bodily injury," either (1) sustained by any person arising out of acts or omissions at the designated job site which are related to or are in connection with the work described in Item 6 of the declarations, or (2) sustained at the designated job site by the Contractor or any employee of the Contractor, or by any employee of the Governmental Authority specified in Item 5 of the Declarations, or by any designated employee of the insured whether or not arising out of such acts or omissions.

Coverage B--Property Damage Liability.

To pay on behalf of the insured all sums which the insured shall become legally obligated to pay as damages because of physical injury to or destruction of property, including loss of use of any property due to such injury or destruction, hereinafter called "property damage," arising out of acts or omissions at the designated job site which are related to or are in connection with the work described in Item 6 of the declarations.

Coverage C--Physical Damage to Property.

To pay for direct and accidental loss of or damage to rolling stock and their contents, mechanical construction equipment, or motive power equipment, hereinafter called "loss," arising out of acts or omissions at the designated job site which are related to or are in connection with the work described in Item 6 of the declarations; provided such property is owned by the named insured or is leased or entrusted to the named insured under a lease or trust agreement.

II. Definitions.

- (a) **Insured.**--The unqualified word "insured" includes the named insured and also includes any executive officer, director or stockholder thereof while acting within the scope of his duties as such.
- (b) **Contractor.**--The word "contractor" means the Contractor designated in Item 4 of the declarations and includes all subcontractors of said Contractor but shall not include the named insured.

- (c) **Designated employee of the insured.**--The words "designated employee of the insured" mean:
- (1) any supervisory employee of the insured at the job site,
 - (2) any employee of the insured while operating, attached to or engaged on work trains or other railroad equipment at the job site which are assigned exclusively to the Contractor, or
 - (3) any employee of the insured not within (1) or (2) who is specifically loaned or assigned to the work of the Contractor for prevention of accidents or protection of property, the cost of whose services is borne specifically by the Contractor or by govern-mental authority.
- (d) **Contract.**--The word "contract" means any contract or agreement to carry a person or property for a consideration or any lease, trust or interchange contract or agreement respecting motive power, rolling stock or mechanical construction equipment.

III. Defense, Settlement, Supplementary Payments.

With respect to such insurance as is afforded by this policy under Coverage's A and B, the company shall:

- (a) defend any suit against the insured alleging such bodily injury or property damage and seeking damages which are payable under the terms of this policy, even if any of the allegations of the suit are groundless, false or fraudulent; but the company may make such investigation and settlement of any claim or suit as it deems expedient;
- (b) pay, in addition to the applicable limits of liability:
 - (1) all expenses incurred by the company, all costs taxed against the insured in any such suit and all interest on the entire amount of any judgment therein which accrues after entry of the judgment and before the company has paid or tendered or deposited in court that part of the judgment which does not exceed the limit of the company's liability thereon;
 - (2) Premiums on appeal bonds required in any such suit, premiums on bonds to release attachments for an amount not in excess of the applicable limit of liability of this policy, but without obligation to apply for or furnish any such bonds;
 - (3) expenses incurred by the insured for such immediate medical and surgical relief to others as shall be imperative at the time of the occurrence;
 - (4) all reasonable expenses, other than loss of earnings, incurred by the insured at the company's request.

IV. Policy Period, Territory.

This policy applies only to occurrences and losses during the policy period and within the United States of America, its territories or possessions, or Canada.

EXCLUSIONS

This policy does not apply:

- (a) to liability assumed by the insured under any contract or agreement except a contract as defined herein;
- (b) to bodily injury or property damage caused intentionally by or at the direction of the insured;
- (c) to bodily injury, property damage or loss which occurs after notification to the named insured of the acceptance of the work by the governmental authority, other than bodily injury, property damage or loss resulting from the existence or removal of tools, uninstalled equipment and abandoned or unused materials;
- (d) under Coverage's A(1), B and C, to bodily injury, property damage or loss, the sole proximate cause of which is an act or omission of any insured other than acts or omissions of any designated employee of any insured;
- (e) under Coverage A, to any obligation for which the insured or any carrier as his insurer may be held liable under any workmen's compensation, unemployment compensation or disability benefits law, or under any similar law; provided that the Federal Employers' Liability Act, U.S. Code (1946), Title 45, Sections 51-60, as amended, shall for the purposes of this insurance be deemed not to be any similar law;
- (f) under Coverage B, to injury to or destruction of property (1) owned by the named insured or (2) leased or entrusted to the named insured under a lease or trust agreement.
- (g) 1. Under any liability coverage, to injury, sickness, disease, death or destruction
 - (a) with respect to which an insured under the policy is also an insured under a nuclear energy liability policy issued by Nuclear Energy Liability Insurance Association, Mutual Atomic Energy Liability Underwriters or Nuclear Insurance Association of Canada, or would be an insured under any such policy but for its termination upon exhaustion of its limit of liability; or
 - (b) resulting from the hazardous properties of nuclear material and with respect to which (1) any person or organization is required to maintain financial protection pursuant to the Atomic Energy Act of 1954, or any law amendatory thereof, or (2) the insured is, or had this policy not been issued would be, entitled to indemnity from the United States of America, or any agency thereof, under any agreement entered into by the United States of America, or any agency thereof, with any person or organization.
- 2. Under any medical payments coverage, or under any Supplementary Payments provision relating to immediate medical or surgical relief, to expenses incurred with respect to bodily injury, sickness, disease or death resulting from the hazardous properties of nuclear material and arising out of the operation of a nuclear facility by any person or organization.

3. Under any liability coverage, to injury, sickness, disease, death or destruction resulting from the hazardous properties of nuclear material, if

- the nuclear material (1) is at any nuclear facility owned by, or operated by or on behalf of, an insured or (2) has been discharged or dispersed therefrom;

(b) the nuclear material is contained in spent fuel or waste at any time possessed, handled, used, processed, stored, transported or disposed of by or on behalf of an insured; or

(c) the injury, sickness, disease, death or destruction arises out of the furnishing by an insured of services, materials, parts or equipment in connection with the planning, construction, maintenance, operation or use of any nuclear facility, but if such facility is located within the United States of America, its territories or possessions or Canada, this exclusion (c) applies only to injury to or destruction of property at such nuclear facility.

4. As used in this exclusion:

"hazardous properties" include radioactive, toxic or explosive properties;

"nuclear material" means source material, special nuclear material or byproduct material;

"source material", "special nuclear material", and "byproduct material" have the meanings given them in the Atomic Energy Act of 1954 or in any law amendatory thereof;

"spent fuel" means any fuel element or fuel component, solid or liquid, which has been used or exposed to radiation in a nuclear reactor;

"waste" means any waste material (1) containing byproduct material and (2) resulting from the operation by any person or organization of any nuclear facility included within the definition of nuclear facility under paragraph (a) or (b) thereof;

"nuclear facility" means

(a) any nuclear reactor,

(b) any equipment or device designed or used for (1) separating the isotopes of uranium or plutonium, (2) processing or utilizing spent fuel, or (3) handling, processing or packaging waste,

(c) any equipment or device used for the processing, fabricating or alloying of special nuclear material if at any time the total amount of such material in the custody of the insured at the premises where such equipment or device is located consists of or contains more than 25 grams of plutonium or uranium 233 or any combination thereof, or more than 250 grams of uranium 235,

(d) any structure, basin, excavation, premises or place prepared or used for the storage or disposal of waste, and includes the site on which any of the foregoing is located, all operations conducted on such site and all premises used for such operations;

"nuclear reactor" means any apparatus designed or used to sustain nuclear fission in a self-supporting chain reaction or to contain a critical mass of fissionable material;

with respect to injury to or destruction of property, the word "injury" or "destruction" includes all forms of radioactive contamination of property.

- (h) under Coverage C, to loss due to nuclear reaction, nuclear radiation or radioactive contamination, or to any act or condition incident to any of the foregoing.

CONDITIONS

(The conditions, except conditions 3, 4, 5, 7, 8, 9, 10, 11 and 12, apply to all coverage's. Conditions 3, 4, 5, 7, 8, 9, 10, 11 and 12, apply only to the coverage noted thereunder.)

1. Premium.--The premium bases and rates for the hazards described in the declarations are stated therein. Premium bases and rates for hazards not so described are those applicable in accordance with the manuals in use by the company.

The term "contract cost" means the total cost of all work described in Item 6 of the declarations.

The term "rental cost" means the total cost to the Contractor for rental of work trains or other railroad equipment, including the remuneration of all employees of the insured while operating, attached to or engaged thereon. The advance premium stated in the declarations is an estimated premium only. Upon termination of this policy the earned premium shall be computed in accordance with the company's rules, rates, rating plans, premiums and minimum premiums applicable to this insurance. If the earned premium thus computed exceeds the estimated advance premium paid, the company shall look to the Contractor specified in the declarations for any such excess; if less, the company shall return to the said Contractor the unearned portion paid.

In no event shall payment of premium be an obligation of the named insured.

2. Inspection.--The named insured shall make available to the company records of information relating to the subject matter of this insurance.

The company shall be permitted to inspect all operations in connection with the work described in Item 6 of the declarations.

3. Limits of Liability, Coverage A.--The limit of bodily injury liability stated in the declarations as applicable to "each person" is the limit of the company's liability for all damages, including damages for care and loss of services, arising out of bodily injury sustained by one person as the result of any one occurrence; the limit of such liability stated in the declarations as applicable to "each occurrence" is, subject to the above provision respecting each person, the total limit of the company's liability for all such damage arising out of bodily injury sustained by two or more persons as the result of any one occurrence.

4. Limits of Liability, Coverage's B and C.--The limit of liability under Coverages B and C stated in the declarations as applicable to "each occurrence" is the total limit of the company's liability for all damages and all loss under Coverage B and C combined arising out of physical injury to, destruction or loss of all property of one or more persons or organizations, including the loss of use of any property due to such injury or destruction under Coverage B, as the result of any one occurrence.

Subject to the above provision respecting "each occurrence," the limit of liability under Coverage's B and C stated in the declarations as "aggregate" is the total limit of the company's liability for all damages and all loss under Coverage's B and C combined arising out of physical injury to, destruction or loss of property, including the loss of use of any property due to such injury or destruction under Coverage B.

Under Coverage C, the limit of the company's liability for loss shall not exceed the actual cash value of the property, or if the loss is of a part thereof the actual cash value of such part, at time of loss, nor what it would then cost to repair or replace the property or such part thereof with other of like kind and quality.

5. Severalty of Interests, Coverage's A and B.-- The term "the insured" is used severally and not collectively, but the inclusion herein of more than one insured shall not operate to increase the limits of the company's liability.

6. Notice.--In the event of an occurrence or loss, written notice containing particulars sufficient to identify the insured and also reasonably obtainable information with respect to the time, place and circumstances thereof, and the names and addresses of the injured and of available witnesses, shall be given by or for the insured to the company or any of its authorized agents as soon as practicable. If claim is made or suit is brought against the insured, he shall immediately forward to the company every demand, notice, summons or other process received by him or his representative.

7. Assistance and Cooperation of the Insured, Coverage's A and B.--The insured shall cooperate with the company and, upon the company's request, attend hearings and trials and assist in making settlements, securing and giving evidence, obtaining the attendance of witnesses and in the conduct of suits. The insured shall not, except at his own cost, voluntarily make any payment, assume any obligation or incur any expense other than for such immediate medical and surgical relief to others as shall be imperative at the time of accident.

8. Action Against Company, Coverages A and B.--No action shall lie against the company unless, as a condition precedent thereto, the insured shall have fully complied with all the terms of this policy, nor until the amount of the insured's obligation to pay shall have been finally determined either by judgment against the insured after actual trial or by written agreement of the insured, the claimant and the company.

Any person or organization or the legal representative thereof who has secured such judgment or written agreement shall thereafter be entitled to recover under this policy to the extent of the insurance afforded by this policy. No person or organization shall have any right under this policy to join the company as a party to any action against the insured to determine the insured's liability. Bankruptcy or insolvency of the insured or of the insured's estate shall not relieve the company of any of its obligations hereunder.

Coverage C.--No action shall lie against the company unless, as a condition precedent thereto, there shall have been full compliance with all the terms of this policy nor until 30 days after proof of loss is filed and the amount of loss is determined as provided in this policy.

9. Insured's Duties in Event of Loss, Coverage C.--In the event of loss the insured shall:

- (a) protect the property, whether or not the loss is covered by this policy, and any further loss due to the insured's failure to protect shall not be recoverable under this policy; reasonable expenses incurred in affording such protection shall be deemed incurred at the company's request;
- (b) file with the company, as soon as practicable after loss, his sworn proof of loss in such form and including such information as the company may reasonably require and shall, upon the company's re-request, exhibit the damaged property.

10. Appraisal, Coverage C.--If the insured and the company fail to agree as to the amount of loss, either may, within 60 days after the proof of loss is filed, demand an appraisal of the loss. In such event the insured and the company shall each select a competent appraiser, and the appraisers shall select a competent and disinterested umpire. The appraisers shall state separately the actual cash value and the amount of loss and failing to agree shall submit their differences to the umpire. An award in writing of any two shall determine the amount of loss. The insured and the company shall each pay his chosen appraiser and shall bear equally the other expenses of the appraisal and umpire.

The company shall not be held to have waived any of its rights by any act relating to appraisal.

11. Payment of Loss, Coverage C.--The company may pay for the loss in money but there shall be no abandonment of the damaged property to the company.

12. No Benefit to Bailee, Coverage C.--The insurance afforded by this policy shall not inure directly or indirectly to the benefit of any carrier or bailee, other than the named insured, liable for loss to the property.

13. Subrogation.--In the event of any payment under this policy, the company shall be subrogated to all the insured's rights of recovery therefor against any person or organization and the insured shall execute and deliver instruments and papers and do whatever else is necessary to secure such rights. The insured shall do nothing after loss to prejudice such rights.

14. Application of Insurance.--The insurance afforded by this policy is primary insurance.

15. Three Year Policy.--A policy period of three years is comprised of three consecutive annual periods. Computation and adjustment of earned premium shall be made at the end of each annual period. Aggregate limits of liability as stated in this policy shall apply separately to each annual period.

16. Changes.--Notice to any agent or knowledge possessed by any agent or by any other person shall not effect a waiver or a change in any part of this policy or stop the company from asserting any right under the terms of this policy; nor shall the terms of this policy be waived or changed, except by endorsement issued to form a part of this policy.

17. Assignment.--Assignment of interest under this policy shall not bind the company until its consent is endorsed hereon.

18. Cancellation.--This policy may be canceled by the named insured by mailing to the company written notice stating when thereafter the cancellation shall be effective. This policy may be canceled by the company by mailing to the named insured, Contractor and governmental authority at the respective addresses shown in this policy written notice stating when not less than 30 days thereafter such cancellation shall be effective. The mailing of notice as aforesaid shall be sufficient proof of notice. The effective date and hour of cancellation stated in the notice shall become the end of the policy period. Delivery of such written notice either by the named insured or by the company shall be equivalent to mailing.

If the named insured cancels, earned premium shall be computed in accordance with the customary short rate table and procedure. If the company cancels, earned premium shall be computed pro rata. Premium adjustment may be made either at the time cancellation is effected or as soon as practicable after cancellation becomes effective, but payment or tender of unearned premium is not a condition of cancellation.

19. Declaration.--By acceptance of this policy the named insured agrees that such statements in the declarations as are made by him are his agreements and representations, that this policy is issued in reliance upon the truth of such representations and that this policy embodies all agreements existing between himself and the company or any of its agents relating to this insurance.

In witness whereof, the _____ Insurance Company has caused this policy to be signed by its president and a secretary at _____, and counter-signed on the declaration page by a duly authorized agent of the company.

(Facsimile of Signature)

(Facsimile of Signature)

Secretary

President

CERTIFICATE OF INSURANCE
Exhibit "C"

This is to certify to:

- (1) Railroad Agreements Branch, MS #9-2/9G
Engineering Services
California Department of Transportation
State of California
1801 30th Street, Sacramento, California 95816

RAILROAD FILE NO.
PUC NO. B-495.6
495.6 Alhambra Sub

- (2) and to the following Railroad Company

that such insurance as is afforded by the policy or policies described below for bodily injury liability and property damage liability is in full force and effect as of the date of this certificate and covers the following contractor as a named insured with respect to liability for damages arising out of operations performed by or for the named insured in connection with the contract or work described below.

1. Named Insured and Address

This is to certify that policies of insurance listed below have been issued to the insured named above and are in force at this time. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions and conditions of such policies.

2. Description of Work

Contract No. _____

3. Coverage's	Policy Expiration Date	Limits of Liability Each Occurrence	Aggregate
Contractor's Bodily Injury Liability and Property Damage Liability			
Umbrella or Excess Liability			

All of the coverages include coverage for the completed operations hazard, and X, C and U exposures.

Name of Insurance Company by Coverage

Coverage's	Company	Policy Number
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Bodily Injury Liability

Property Damage Liability

Umbrella or Excess Liability

4. The policy or policies described above will not be amended, altered, modified or cancelled until thirty (30) days after written notice thereof has been given by registered mail to the Railroad named as certificate holder in this certificate.

Certificate Date:

For _____
(Insurance Company)

By _____
(Authorized Agent or Representative)

State of California
Department of Transportation
DH-0S-A104(8-10-00)

CONTRACTOR'S ENDORSEMENT

A. As a condition to entering upon Railroad's right-of-way to perform work pursuant to this agreement, Licensee's contractor, _____, whose address is _____ (hereinafter "Contractor"), agrees to comply with and be bound by all the terms and provisions of this agreement relating to the work to be performed and the insurance requirements set forth in Section 13 of the Contract Special Provisions.

B. Before the Contractor commences any work, the Contractor will provide the Railroad with (1) a binder of insurance for the Railroad Protective Liability Insurance described in Section 13.2 of the Contract Special Provisions, and the original policy (or a certified duplicate original policy), and (2) a certificate issued by its insurance carrier providing the other insurance coverage required pursuant to Section 13.2 of the Contract Special Provisions in a policy or policies which contain the following type endorsement:

UNION PACIFIC RAILROAD COMPANY is named as an additional insured with respect to all liabilities arising out of Insured's performance of work on behalf of the State.

C. This endorsement shall be completed and directed to:

[Mr. Freddy C. Cheung]
Manager Industry & Public Projects
19100 Slover Ave.
Bloomington, CA. 92316

CONTRACTOR (print name on above line)

By: _____

Title: _____

SECTION 13-3. RELATIONS WITH SCRRA

13-3.01 GENERAL

13-3.01A PURPOSE

The rules and requirements are to protect SCRRA's operations, including the proper manner of protecting the tracks, signals, fiber optic cables, pipe lines, other Property, and tenants or licensees upon, adjacent to, across (under, or over), and along SCRRA and Member Agency Property during the construction and maintenance activities on or adjacent to Railway Property.

13-3.01B DEFINITIONS

SCRRA is a joint powers authority of five county transportation authorities, organized under the provisions of the Joint Powers Act, Sections, 6500 et seq. of the California Government Code, and Section 130255 of the California Public Utilities

Code, that builds, maintains, and operates Metrolink commuter railway system within Los Angeles, Orange, Riverside, San Bernardino and Ventura Counties.

MEMBER AGENCY is that specific county transportation Member Agency(s), whose Property is directly affected by the Contractor's actions herein. The 5 county transportation Member Agencies are the Los Angeles County Metropolitan Transportation Authority, the Orange County Transportation Authority, the Riverside County Transportation Commission, the San Bernardino Associated Governments, and the Ventura County Transportation Commission.

PROPERTY is defined herein to mean the real and personal Property of SCRRA or Member Agency(s).

CONTRACTOR, is an individual, firm, third party, partnership or corporation, or combination thereof, private, municipal or public, including joint ventures, retained by SCRRA or another public entity to provide construction or maintenance services which may impact SCRRA Property and who is referred to throughout this document by singular number and masculine gender.

PUBLIC AGENCY, is defined to mean (i) the federal government and agencies, departments or subdivisions thereof, and (ii) the State of California or other state, and county, city, city and county, district, public authority, public agency, joint powers, municipal corporation, or other political subdivision or public corporation therein.

13-3.01C SUBMITTAL

Within 5 working days prior to the planned initiation of work which may infringe on SCRRA or Member Agency Property, the Contractor shall furnish SCRRA with 3 sets of, working drawings showing details of construction affecting the tracks and property, specifications, falsework plans, falsework removal plans, shoring plans, shoring or cribbing plans not included in the contract, shop drawings, traffic plans, and other incidents not detailed in plans. The Contractor shall also furnish 3 sets of calculations of falsework, shoring, or cribbing which are to be located over, under or adjacent to tracks. Construction details affecting the tracks and the Property, and not included in the contract plans shall be submitted to SCRRA by way of the Public Agency for approval. Plans and calculations shall be stamped by a registered Professional Engineer licensed in the State of California.

The Contractor shall not begin work until notified by SCRRA that such plans have been approved. Approval of the plans and calculations by SCRRA shall not relieve the Contractor of responsibility for full compliance with contract requirements, for correctness of dimensions, clearances and material quantities, for proper design of details, for proper fabrication and construction techniques, for proper coordination with other trades, and for providing devices required for safe and satisfactory construction and operation.

13-3.02 RULES AND REQUIREMENTS

13-3.02A REFERENCES

When working on the Property, the Contractor shall comply with the rules and regulations contained in the current editions of the following documents which are "references" incorporated in this document as if they were set in full in this paragraph. The Contractor agrees to abide by said rules and regulations when on the Property.

1. Right-of-Entry agreement, SCRRA Form No. 6

The Right-of-Entry agreement is an agreement between SCRRA and the Contractor that permit the Contractor, under certain agreed upon conditions, to encroach upon, adjacent to, across (under or over), and along SCRRA or Member Agency Property.

2. General Safety Regulations for Construction/Maintenance Activity on Railway Property.

The Regulations are for the benefit of employees of the Contractors and others who are involved in construction, maintenance or other activities on the right-of-way. The Regulations were developed in the interest of safety and protection of trains, passengers or personnel of SCRRA, Member Agency, Operating Railroad(s), and the employees of the Contractor.

3. California Public Utilities Commission (CPUC) General Orders.

4. American Railway Engineering and Maintenance-of-Way Association (AREMA), Manual for Railway Engineering.

5. SCRRA Engineering Standards

13-3.02B COORDINATION

The Contractor shall cooperate with SCRRA where work is over or under the tracks, or within the limits of the Property to expedite the work and to avoid interference with the operation of Railway equipment.

The Contractor shall understand the Contractor's right to enter the Property is subject to the absolute right of SCRRA or Member Agency to cause the Contractor's work on the Property to cease if, in the opinion of SCRRA or Member Agency, the Contractor's activities create hazards to the Property, employees, and/or operations.

It is expected that SCRRA and Member Agency will cooperate with the Contractor such that the work may be handled and performed in an efficient manner, but the Contractor shall have no claim whatsoever for damages or for extra or additional compensation in the event its work is delayed by the work of SCRRA or Member Agency.

The Contractor shall take protective measures to keep the Property, including track ballast, free of sand, debris, and other foreign objects and materials resulting from its operations. Damage to the Property resulting from Contractor's operations will be repaired or replaced by SCRRA or Member Agency at their option and the cost of such repairs or replacement shall be recovered from the Contractor.

The Contractor shall perform the construction work in such a manner and at such times as shall not endanger or interfere with SCRRA or Member Agency's operations, including relation to the proper manner of protecting the tracks, signals, fiber optic cables, pipe lines, other Property, and tenants or licensees at or in the vicinity of the work during the period of construction.

Forecasts of train traffic and schedules are approximate. The train schedule shall be used for planning purposes only and shall not be used for scheduling actual work around the railroad tracks. SCRRA reserves the right to run as many trains as practical on any track at any time. The operation of the trains will be at sole discretion of SCRRA or Member Agency. The Contractor's work may be halted or delayed whenever necessary to accommodate train service.

13-3.02C EXCAVATION AND BACKFILL

The Contractor shall compact backfill to 90 percent of maximum standard density as determined by AASHTO T-99 or ASTM D-698. When necessary to excavate beyond the normal lines of excavation to remove boulders or other interfering objects, the voids remaining after such materials are removed shall be backfilled with suitable material approved by SCRRA. The material obtained from the project excavation will be suitable for use as fill or backfill, provided that organic material, rubbish, debris, large rocks, and other objectionable material is removed. Excess material shall be disposed of by widening fills or hauling off-site. The excess material shall not be piled-up or scattered on the right-of-way.

The Contractor shall perform excavation and grading so that the finished surfaces are in uniform planes with no abrupt breaks in surface and having positive drainage on the right-of-way away from the track structure.

13-3.02D CLEARANCES

The Contractor shall abide by the following clearances during the course of construction:

- 15'-0" Horizontally from centerline of track (including temporary falsework)
- 22'-6" Vertically above top of rail
- 21'-6" Vertically above top of rail (Temporary Falsework Clearance—Subject to CPUC approval)
- 27'-0" Vertically above top of rail for electric wires carrying less than 750 volts
- 28'-0" Vertically above top of rail for electric wires carrying 750 volts to 15,000 volts
- 30'-0" Vertically above top of rail for electric wires carrying 15,000 volts to 20,000 volts
- 34'-0" Vertically above top of rail for electric wires carrying more than 20,000 volts

Infringement on the above clearances or walkways due to the Contractor's operations shall be submitted to SCRRA and to the Public Agency and shall not be undertaken until approved in writing by SCRRA, and until the Public Agency has obtained necessary authorization from CPUC for the infringement. No extra compensation will be allowed in the event the Contractor's work is delayed pending SCRRA approval, and/or CPUC authorization.

In the case of impaired vertical clearance above top of rail, SCRRA shall have the option of installing tell-tales or other protective devices SCRRA deems necessary for protection of SCRRA or Member Agency trainmen or rail traffic.

13-3.02E SCRRA SAFETY AND PROTECTIVE SERVICES

The Contractor shall request and arrange for a flag person, inspector and other protective services from SCRRA authorized representative for the following conditions:

- A. When Contractor's personnel and equipment(s) are within 20 feet of the nearest rail.
- B. When equipment is standing or being operated within or adjacent to the Property, or when erection or construction activities are in progress within such limits, regardless of elevation above or below track.

- C. For excavation below the elevation of track sub-grade if, in the opinion of SCRRA or Member Agency's representative, track or other Property may be subject to settlement or movement.
- D. For clearing, grubbing, grading, or blasting in proximity to the Property which, in the opinion of SCRRA or Member Agency's representative, may endanger the Property or operations.
- E. For street construction and maintenance activities requiring temporary work area traffic control which may affect or create unsafe conditions for employees, public, trains and vehicles.
- F. The Contractor shall protect, in place, the existing fiber-optic facilities that are approximately parallel to the SCRRA corridor that crosses in front of Abutment 1 of the East El Monte Overhead. These facilities shall be protected during excavation, pile driving, concrete and reinforcing steel placement and backfill operations. The method of protection shall be at the discretion of the Contractor, subject to approval by the Engineer and SCRRA. Pile driving operations shall provide a minimum clearance to the facility of 18 inches. Where the facility is exposed, it shall be continuously supported to prevent deflection of the fiber optic line. For locations where pile driving/drilling equipment will be directly over the fiber optic facilities, cover plates shall be placed over the top of the facilities to protect the line from falling objects. The design of the cover plate is the responsibility of the Contractor. Cover plates shall be designed for the anticipated potential loads due to the Contractor's construction operations. Cover plates shall be made of steel and shall be a minimum of 0.5" thick.

SCRRA will furnish personnel or protective services when, in the opinion of SCRRA's representative, the Property, including, but not limited to, tracks, buildings, signals, wire lines or pipelines, may be endangered. The Contractor agrees to reimburse SCRRA or Member Agencies for costs and expenses incurred by SCRRA or Member Agency in connection with the safety and protective services.

The cost of flagging and inspection provided by SCRRA or Member Agency on State Contracts during the period of construction of that portion of the project located on or near the Property, as deemed necessary for the protection of SCRRA and Member Agency's facilities and trains, will be borne on State for a period of 100 working days beginning on the date work commences on or near the Property.

13-3.02F TIME OF WORK

The contractor shall work daylight hours only and no more than 5 weekdays (not on Saturday, Sunday or legal holidays) per week. Variations from this schedule shall have approval of SCRRA's authorized representative.

13-3.02G UTILITIES

The Contractor shall be responsible for the location and protection of surface, sub-surface, and overhead utilities and structures. Approval of the project and this Right-of-Entry agreement by SCRRA and/or Member Agency does not constitute a representation as to the accuracy of completeness of location or the existence or non-existence of utilities or structures within the limits of this project. The Contractor shall notify the appropriate regional notification centers [Underground Service Alert (DIGALERT) at 1-800-227-2600], railway companies, and utility companies prior to performing excavation or other work close to underground pipelines, conduits, ducts, wires, or other structures. The Contractor shall call SCRRA signal department at (909) 392-8476 to mark signals and communications and conduits. In case of signal emergencies or grade crossing problems, the Contractor shall call SCRRA's 24-hour signal emergency number (888) 446-9720.

Oil, gas, and fiber optic lines run along most of the right-of-way. Damage to any of the lines will create dangerous and hazardous situation. The Contractor shall exercise extreme caution while working on the right-of-way.

13-3.02H HAZARDOUS/TOXIC MATERIALS

The Contractor shall operate and maintain the Property in compliance with, and shall not cause or permit the Property to be in violation of federal, state or local environmental, health and/or safety-related laws, regulations, standards, decisions of the courts, permits or permit conditions, currently existing or as amended or adopted in the future which are or become applicable to the Contractor or SCRRA or Member Agency Property. Except for hazardous materials expressly approved by SCRRA and Member Agency in writing, the Contractor shall not cause or permit, hazardous materials to be brought upon, stored, used, generated, treated or disposed of on or about the Property. Hazardous materials on the site shall be stored, used, generated and disposed of in accordance with applicable environmental laws.

In the event of release on or contamination of the Property, the Contractor, at the Contractor's sole expense, shall promptly clean up the affected Property (including SCRRA or Member Agency Property and affected adjacent Property - whether or not owned by SCRRA or Member Agency) and to return the affected Property to the condition existing prior to such release or contamination, to the satisfaction of SCRRA and Member Agency and governmental authorities having jurisdiction thereover.

The Contractor shall cooperate with SCRRRA in tests or inspections necessary by SCRRRA or Member Agency. The Contractor shall pay or reimburse SCRRRA or Member Agency, as appropriate, for costs and expenses incurred due to the tests, inspections or corrective work and inspections thereafter.

13-3.02I EXPLOSIVES

The Contractor shall not use or store explosives on the Property without prior written approval from SCRRRA's Director of Engineering and Construction.

13-3.02J TEMPORARY CONSTRUCTION CROSSINGS

The Contractor shall not move equipment or materials across the tracks. No vehicular crossing over SCRRRA or Member Agency tracks shall be installed or used by the Contractor without prior written permission of SCRRRA or Member Agency. Proper grade crossing warning devices and other devices required by SCRRRA shall be provided at the Contractor's expense.

13-3.02K TRAFFIC CONTROL

The Contractor shall provide safe and effective control near a highway/railway grade crossing. The Contractor shall provide safe conditions for employees, public, trains and vehicles. The Contractor shall visit the job site to study traffic conditions, traffic controls, traffic lane requirements, physical features, visibility and pedestrian traffic.

The Contractor shall prepare a traffic control plan. The traffic control plan shall comply with applicable Department of Transportation, Federal Highway Administration (FHWA) and American Public Works Association (APA) standards. The Contractor shall obtain written approval of the plan from SCRRRA and appropriate local traffic departments prior to initiating work.

The traffic control plan shall include signs, signals, markings, lighting devices, barricades, channelizing and hand signal devices. The traffic control plan shall take into consideration provisions for adequate clearances, lane closures based on traffic volumes, length of time for crossing closer, type of traffic affected, time of day, material and technique of repair, inconvenience, delay and accident potentials.

The traffic control plan shall minimize traffic congestion at the highway/railway grade crossing. Emergency traffic escape routes shall be provided on the downstream side of the highway/railway grade crossing. As many lanes as possible shall be provided for traffic movement in each direction. Traffic detour lanes shall be arranged so that vehicle traffic will be rerouted to both sides of the highway/railway grade crossing. Railroad crossing gate protection shall be maintained in both directions. When railroad crossing gate protection can not be provided, a railroad flag person (railroad flag person protects trains and provides notice of train movement, but does not direct vehicular traffic), Contractor's flag person(s) and/or certified traffic control officer(s) must be present. This type of protection will be used for projects with short duration (four days maximum). SCRRRA approval shall be obtained and SCRRRA reserves the right to approve or disapprove this type protection. If this is not possible or feasible, or at SCRRRA's discretion and direction, railroad-crossing gates shall be temporarily relocated or installed, at Contractor's expense, so that the gates are upstream of the traffic and approaches.

The Contractor shall obtain SCRRRA's written approval for changes in traffic control plan. The Contractor shall notify SCRRRA in writing at least 5 working days in advance of work on the traffic control at the highway/railway grade crossing.

13-3.02L SHEETING AND SHORING REQUIREMENTS

The sheeting shall be designed to support lateral forces caused by the earth, railroad and other surcharge loads. The railroad loading to be applied is a Cooper's E-80 loading.

Footing for piers, columns, walls, or other facilities shall be located and designed so temporary sheeting and shoring for support of adjacent track or tracks during construction shall not be closer than 10 feet from the centerline of the nearest track.

When excavation is within the theoretical railroad embankment line {theoretical embankment line starts horizontally from the center line of the track (18 inches below the bottom of the rail) and extend 11 feet and then bend down at a slope of one and half part horizontal to one part vertical (1.5:1)} interlocking steel sheet piling driven prior to excavation, shall be used to protect track stability.

Shoring outside of the theoretical railroad embankment line may be of soldier piling and lagging elements. Soldier piling and lagging inside the theoretical railroad embankment line may be used when its use is approved by SCRRRA.

Excavation adjacent to track shall be covered and ramped and provided with standard handrails.

The face of jacking and receiving pits shall be located a minimum of 25 feet from the centerline of the nearest track, measured at right angles to the track, unless otherwise approved by SCRRRA. The use of trench boxes may be permitted for jacking and receiving pits; however, trench boxes are not acceptable inside the theoretical railroad embankment line.

13-3.02M RESTORATION OF PROPERTY

Upon completion of its work, the Contractor shall, at the option of SCRRA and Member Agency (a) leave the Property in a condition satisfactory to SCRRA and Member Agency, (b) restore the Property to its original condition (this may include, without limitation, the restoration of fences removed or damaged by the Contractor) and (c) remove the Contractor's tools, equipment and materials from the Property promptly upon completion of work.

Upon receipt of the Contractor's written assertion that the work has been completed, the work will be inspected by SCRRA for acceptance. Work shall be guaranteed by the Contractor against defective workmanship and material furnished by the Contractor for a period of one year from the date the work was accepted by SCRRA.

RIGHT-OF-ENTRY AGREEMENT

SCRRA FORM NO. 6

File No: S0000786

Recollectible No: _____

This Right-of-Entry agreement is between the Southern California Regional Rail Authority

(Hereinafter referred to as SCRRA), and _____

_____(hereinafter referred to as "Contractor."). This temporary Right-of-Entry agreement is for the purpose of _____

_____ upon, adjacent to, across (under and/or over), and along SCRRA and specific county transportation Member Agency(s), (hereinafter referred to as "Member Agency") Property, at or near

_____ as shown on attached drawing(s) (to be submitted by the Contractor with this agreement).

DEFINITIONS

- A. SCRRA, is a joint powers authority of five county transportation agencies, organized under the provisions of the Joint Powers Act, Sections, 6500 et seq. of the California Government Code, and Section 130255 of the California Public Utilities Code, that builds, maintains, and operates Metrolink commuter railroad system within Los Angeles, Orange, Riverside, San Bernardino and Ventura Counties.
- B. MEMBER AGENCY, is that specific county transportation Member Agency(s), whose Property is directly affected by the Contractor's actions herein. The county transportation Member Agencies are the Los Angeles County Metropolitan Transportation Authority, the Orange County Transportation Authority, the Riverside County Transportation Commission, the San Bernardino Associated Governments, and the Ventura County Transportation Commission.
- C. PROPERTY, is defined herein to mean the real and/or personal property of SCRRA and/or Member Agency(s).
- D. INDEMNITIES, are SCRRA and Member Agency, and their respective officers, commissioners, employees, agents, successors and assigns.
- E. CONTRACTOR, is an individual, firm, partnership or corporation, or combination thereof, private, municipal or public, including joint ventures, who is referred to throughout this document by singular number and masculine gender.
- F. OPERATING RAILROAD, is/are that specific passenger or freight related railroad company(s) validly operating on SCRRA and Member Agency track(s). The Operating Railroads are, any combinations of, the National Railroad Passenger Corporation, the Union Pacific Railroad Company, and the Burlington Northern Santa Fe Corporation.

As one of the inducements to and as a part of the consideration for SCRRA and/or Member Agency granting permission to the Contractor to perform such work upon, and adjacent to, across (under, and/or over), and along the Property, the Contractor does hereby agree with SCRRA as follows:

1. References

When working on the Property, the Contractor must comply with the rules and regulations contained in the current editions of the following documents which are "references" incorporated in this document as if they were set out in full in this paragraph. The Contractor, by its signature on the Right-of-Entry agreement, acknowledges receipt of these documents and agrees to abide by said rules and regulations at all times when on the Property.

- A. Rules and Requirements for Construction on Railway Property, SCRRA Form No. 37
- B. General Safety Regulations for Construction/Maintenance Activity on Railway Property

2. Starting of Use of Property

The Contractor shall not enter onto the Property unless prior thereto the Contractor has possession of a fully executed copy of this Agreement, has arranged for SCRRA safety and protective services (flag person, inspector and/or other protective services), and has paid charges and fees.

3. Termination of Agreement

SCRRA or Member Agency reserves the right to revoke this temporary agreement at any time upon two hours notice. Unless subsequently modified by SCRRA, this temporary right of entry shall extend until _____, at which time it shall expire automatically. The Contractor agrees to notify SCRRA, in writing and verbally, when use of the Property or work is completed. Under no circumstances shall this temporary right of entry be construed as granting to the Contractor or its subcontractors any right, title or interest of any kind or character in, on, or about any Property.

At the request of SCRRA or Member Agency, Contractor shall remove from the Property any employee of Contractor or any subcontractor or any employee of any subcontractor who fails to conform to the instructions of SCRRA's or Member Agency's representative in connection with work on the Property, and any right of Contractor to enter upon the Property shall be suspended until such request of SCRRA or Member Agency is met. Contractors shall indemnify and hold harmless SCRRA and Member Agency against any claim arising from the removal of any such employee from the Property.

4. Indemnification

Contractor, on behalf of itself and its employees, subcontractors, agents, successors, and assigns, agrees to indemnify, defend, by counsel satisfactory to SCRRA and Member Agency, and hold harmless SCRRA and Member Agency, and their respective officers, commissioners, employees, agents, successors and assigns (hereinafter individually and collectively referred to as, "**Indemnities**"), and each of them to the maximum extent allowed by law, from and against all loss, liability, claims, demands, suits, liens, claims of lien, damages (including consequential damages), costs and expenses (including, without limitation, any fines, penalties, judgments, actual litigation expenses, and experts' and actual attorneys' fees), that are incurred by or asserted against Indemnities arising out of or connected in any manner with (i) the acts or omissions to act of the Contractor, or its officers, directors, affiliates, subcontractors or agents or anyone directly or indirectly employed by them or for whose acts the foregoing persons are liable (collectively, "**Personnel**") in connection with or arising from the presence upon or performance of activities by the Contractor or its Personnel with respect to the Property, (ii) bodily and/or personal injury or death of any person (including employees of Indemnities) or damage to or loss of use of Property resulting from such acts or omissions of the Contractor or its Personnel, or (iii) non-performance or breach by Contractor or its Personnel of any term or condition of this Agreement, in each case whether occurring during the term of this Agreement or thereafter.

The foregoing indemnity shall be effective regardless of any negligence (whether active, passive, derivative, joint, concurring or comparative) on the part of Indemnities, unless caused solely by the gross negligence or willful misconduct of Indemnities; shall survive termination of this Agreement; and is in addition to any other rights or remedies which Indemnities may have under the law or under this Agreement.

Claims against the Indemnities by the Contractor or its Personnel shall not limit the Contractor's indemnification obligations hereunder in any way, whether or not such claims against Indemnities may result in any limitation of the amount or type of damages, compensation, or benefits payable by or for the Contractor or its Personnel under workers' compensation acts, disability benefit acts or other employee benefit acts or insurance.

5. Assumption of Liability

To the maximum extent allowed by law, the Contractor assumes any and all risk of loss, damage or injury of any kind to any person or property, including without limitation, the Property and any other property of, or under the control or custody of, the Contractor or its Personnel. The Contractor's assumption of risk shall include, without limitation, loss or damage caused by defects in any structure or improvement on the Property, accident or fire or other casualty on the Property, or electrical discharge, noise or vibration resulting from SCRRA, Member Agency, and Operating Railroad transit operations on or near the Property and any other persons or companies employed, retained or engaged by SCRRA or Member Agency. The Contractor, on behalf of itself and its Personnel (as defined in Section 4, "Liability and Indemnification") as a material part of the consideration for this Agreement, hereby waives all claims and demands against the Indemnities or any such loss, damage or injury of the Contractor and/or its Personnel. The Contractor agrees not to file, cause to be filed or initiate any proceeding in law, equity or admiralty whether judicial, administrative, mediation or arbitration against the Indemnities regarding any such loss, damage or injury of the Contractor and/or its Personnel. In that connection, the Contractor waives the benefit of California Civil Code Section 1542, which provides as follows:

"A general release does not extend to claims which the creditor does not know or suspect to exist in his favor at the time of executing the release, which if known by him must have materially affected his settlement with the debtor."

The Contractor also waives the benefit of any other Statute or Common Law Principles of similar effect.

The provisions of this Section shall survive the termination of this Agreement.

6. Insurance

The Contractor, at its sole cost and expense, shall obtain and maintain in full force and effect during the term of this Agreement insurance as required by SCRRA or Member Agency in the amounts, coverage and terms and conditions specified, (which terms and conditions will require, among other things, SCRRA as insured and Member Agency & Operating Railroad as additional insured on policies provided by Contractor, severability of interests and primary coverage provisions), and issued by insurance companies as described on Exhibit "C". SCRRA or Member Agency reserves the right, throughout the term of this Agreement, to review and change the amount and type of insurance coverage it requires in connection with this Agreement or work to be performed on the Property. Prior to entering the Property or performing any work or maintenance on the Property, the Contractor shall furnish SCRRA with insurance endorsements or certificates in the form of Exhibit "D", evidencing the existence, amounts and coverage of the insurance required to be maintained thereunder signed by a person authorized by the insurer to bind coverage on its behalf. In most instances, SCRRA and Member Agency do not allow self-insurance, however, if the Contractor can demonstrate assets and retention funds meeting SCRRA and Member Agency self-insurance requirements, SCRRA and Member Agency may permit the Contractor to self-insure, provided, however that the right to self-insure with respect to any coverage required to be maintained hereunder may be granted or revoked by SCRRA and Member Agency at their sole and absolute discretion. SCRRA or Member Agency shall not be liable for the payment of any premiums or assessments for insurance required to be maintained by the Contractor under this Agreement.

Prior to the expiration of any policy, the Contractor shall furnish SCRRA with certificates of renewal or "binders" thereof. Each certificate shall expressly state that such policies shall not be cancelable or otherwise subject to modification except after thirty (30) days prior written notice to SCRRA and Member Agency.

7. No Assignment

The Contractor shall not assign this Agreement nor any right hereunder without SCRRA's and Member Agency's prior written consent.

8. Compliance by Contractor

The Contractor shall take all steps necessary to assure that its subcontractors comply with the terms and conditions of this Agreement and applicable laws and regulations. The Contractor shall immediately remove any lien against the Property arising from performance of work hereunder by Contractor or any subcontractor.

9. Safety Orientation Class

The Contractor and his subcontractors may be required to attend Pre-Construction meeting and/or SCRRA Safety Orientation Class prior to receiving permission to enter the Property.

10. SCRRA Safety and Protective Services

The Contractor must request and arrange for a flag person, inspector and/or other protective services from SCRRA authorized representative for the following conditions:

- A. When Contractor's personnel and equipment(s) are within twenty (20) feet of the nearest rail.
- B. When any part of the equipment is standing or being operated within or adjacent to the property, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.
- C. For any excavation below the elevation of track sub-grade if, in the opinion of SCRRA or Member Agency representative, track or other Property may be subject to settlement or movement.
- D. For any clearing, grubbing, or blasting in proximity to the Property which, in the opinion of the SCRRA or Member Agency's representative, may endanger the Property or operations.
- E. For any street construction and maintenance activities requiring temporary work area traffic control, which may affect or create unsafe conditions for employees, public, trains and vehicles.

SCRRA will furnish such personnel or other protective services when, in the opinion of SCRRA's representative, the Property, including, but not limited to, tracks, buildings, signals, wire lines or pipelines, may be endangered.

The Contractor shall notify SCRRA a minimum of five (5) working days prior to beginning work on the Property and secure an SCRRA flag person and/or inspector and any other protection SCRRA deems necessary. This prior notification does not guarantee the availability of a flag person or inspector for the proposed date of construction. SCRRA's representative to be contacted prior to entering upon premises is Right of Way Engineer, 700 South Flower Street, Suite 2600, Los Angeles, California 90017-4101, and telephone number (213) 452-0256. The rate for SCRRA inspector and flag person is \$75/hour (4 hours minimum)

11. Reimbursement of Costs and Expenditures

- A. The Contractor agrees to reimburse SCRRA or Member Agency for all cost and expense incurred by SCRRA or Member Agency in connection with said work, including without limitation the expense of furnishing such inspector, and flag person as SCRRA deems necessary, the installation and removal of falsework beneath tracks, restoration of railroad roadbed and tracks, installation of protective devices in case of impaired clearances, and restoration of the Property to the same condition as when Contractor entered thereon, or to a condition satisfactory to SCRRA's and Member Agency's representative.
- B. The Contractor also agrees to reimburse SCRRA, Member Agency and/or Operating Railroad for any and all cost and expense incurred as a result of Contractor's work which may result in (i) delay to the trains or interference in any manner with the operation of trains, (ii) disruption to normal train operation, (iii) unreasonable inconvenience to the public or private user of the system, (iv) loss of revenue, and (v) alternative method of transportation for the passengers. SCRRA will submit final bills to the Contractor for cost incurred.
- C. Prior to commencement of work, the Contractor shall deposit with SCRRA the sum of _____ dollars (\$) _____) representing the estimated expense to be incurred by SCRRA and Member Agency in connection with said work. The deposit shall be applied to SCRRA's and Member Agency's actual costs and expenditures. The Contractor shall be responsible to pay any amount exceeding the above deposit upon receipt of notice or invoice by SCRRA. Any deposit amounts in excess of SCRRA's and Member Agency's costs and expenditures shall be returned to the Contractor within reasonable time.
- D. If there is no amount indicated in the blank space provided above for the deposit to be made by the Contractor, and if prior SCRRA approval is obtained, in lieu of such deposit Contractor shall cause surety bond to be executed by a reliable surety acceptable to SCRRA and Member Agency, conditioned upon the faithful performance of the provisions of this Agreement.

On State Contracts, above conditions A, C, and D do not apply. The cost for flagging and inspection on State Contracts shall be borne by the State and paid through the negotiated Service Contract with the Railroad.

12. Traffic Control

The Contractor shall provide safe and effective traffic control near a highway/railway grade crossing. The Contractor shall make every effort to provide safe conditions for employees, public, trains and vehicles.

The Contractor shall refer to Section 2.11 – Traffic Control, Rules and Requirements for Construction on Railway Property, SCRRA Form No. 37 for additional requirements.

13. Emergency Telephone Numbers

The Contractor must immediately contact SCRRA in case of accidents, personal injury, defect in track, bridge or signals, or any unusual condition, which may affect the safe operation of the railroads. The following are SCRRA's emergency numbers.

Metrolink Chief Dispatcher	(909) 593-0661 or	(888) 446-9715
Metrolink Sheriff's Dispatcher		(323) 563-5280
Signal emergencies and grade crossing problems		(888) 446-9721
Signal and Communications Cable Location		(909) 392-8476

14. Notices

Except as otherwise provided in this agreement, all notices, statements, demands, approvals, or other communications to be given under or pursuant to this agreement will be in writing, addressed to the parties at their respective addresses as provided below, and will be delivered in person, or by certified or registered mail, postage paid, or by telegraph or cable, charges pre-paid.

SCRRRA: Manager Public Projects
Southern California Regional Rail Authority (SCRRRA)
700 South Flower Street, Suite 2600
Los Angeles, CA 90017-4101

Attn: Right of Way Engineer

The Contractor hereby agrees to the terms as set forth in this agreement, and hereby acknowledges receipt of this agreement and of the insurance certificate forms (**Exhibits C & D**) herein provided.

_____	By: _____
(Name of Contractor)	(Signature)
_____	_____
(Address)	(Print Name)
_____	_____
	(Title)
_____	_____
(Telephone)	(Contractor's License No.)

(Fax)

Receipt of the foregoing agreement and certificates of insurance furnished by the Contractor are hereby acknowledged this _____ day of _____ 200____

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY

By: _____	By: _____
(Insurance Coordinator)	(Manager Public Projects)

[Approved As To Form By Legal Counsel]

EXHIBIT "C"
INSURANCE REQUIREMENTS FOR RIGHT OF ENTRY AGREEMENTS

Contractor shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to Property which may arise from or in connection with the performance of the work by the Contractor, his agents, representatives, employees or subcontractors.

1. Minimum Scope of Insurance

Coverage shall be at least as broad as:

- ☒ Insurance Services Office Commercial General Liability coverage (occurrence form CG 0001).
- ☒ Insurance Services Office form No. CA 0001 (Ed. 1/87) covering Auto. Liability, code 1(any auto).
- ☒ Worker's Compensation insurance as required by the State of CA. & Employer's Liability Insurance.
- ☐ Course of Construction insurance form providing coverage for "all risks" of loss.
- ☐ Property insurance against all risks of loss to any tenant improvements or betterment.
- ☐ Contractor's Pollution Liability

2. Minimum Limits of Insurance

Contractor shall maintain limits no less than:

- ☒ General Liability: \$2,000,000 per occurrence for bodily injury, personal injury and Property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
- ☒ Automobile Liability: \$1,000,000 per accident for bodily injury and Property damage.
- ☒ Employer's Liability: \$1,000,000 per accident for bodily injury or disease.
- ☐ Course of Construction: Completed value of the project.
- ☐ Property Insurance: Full replacement cost with no coinsurance penalty provision.
- ☐ Contractor's Pollution Liability: \$1,000,000 per occurrence/\$2,000,000 annual aggregate

3. Certificate Holder/Additional Insured

Certificate holder and/or insured will be the following:

- ☒ Southern California Regional Rail/Authority (SCRRA)

Additionally Insured will be the following:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Los Angeles County Metropolitan Trans. Auth. (MTA)
(BNSF) | <input type="checkbox"/> Burlington Northern Santa Fe Corporation |
| <input type="checkbox"/> Orange County Transportation Authority (OCTA)
(UPRR) | <input checked="" type="checkbox"/> Union Pacific Railroad Company |
| <input type="checkbox"/> Riverside County Transportation Commission (RCTC)
(Amtrak) | <input checked="" type="checkbox"/> National Railroad Passenger Corporation |
| <input type="checkbox"/> San Bernardino Associated Government (SANBAG) | <input type="checkbox"/> Others |
| <input type="checkbox"/> Ventura County Transportation Commission (VCTC) | |

4. Railroad Protective Liability Insurance

- ☒ Railroad Protective Liability Insurance

The Contractor shall provide, with respect to the operations they or any of their Subcontractors perform on the Property as per criteria shown in "Rules and Requirements for Construction on Railway Property", Railroad Protective Liability Insurance, AAR-AASHTO (ISO/RIMA) in the name of the railroads and Member Agencies shown in Section 3 above. Insured:

The policy shall have limits of liability of not less than **\$2 million per occurrence**, combined single limit, for coverage and for losses arising out of injury to or death of all persons, and for physical loss or damage to or destruction of Property, including the loss of use thereof. A **\$6 million annual aggregate** shall apply. If coverage is provided on the London claims-made form, the following provisions shall apply:

- A. The limits of liability shall be not less than \$3 million per occurrence, combined single limit. A \$9 million aggregate may apply.
- B. Declarations item 6, extended claims made date, shall allow an extended claims made period no shorter than the length of the original policy period plus one year.
- C. If equivalent, or better, wording is not contained in the policy form, the following endorsement must be included:

It is agreed that "physical damage to Property" means direct and accidental loss of or damage to rolling stock and their contents, mechanical construction equipment or motive power equipment, railroad tracks, roadbed, categories, signals, bridges or buildings.

For certain low-hazard activity such as minor station maintenance, repair or construction; bridge painting; overhead fiber optic cables crossing; etc., Contractor may request that the SCRRRA and Member Agency waive the requirement to provide the Railroad Protective Liability Insurance, in exchange for a fee. The waiver fee shall be established by the Risk Management Department.

If the exposure to the track is physically separated by a building, floor, or a continuous fence (no thoroughfares) and the employees of the Contractor are explicitly notified that they are not permitted to have any contact with the track, the Railroad Protective Liability Insurance requirement may be waived by SCRRRA's Manager Public Projects or his/her designated representative.

5. Deductibles and Self-Insured Retention's

Any deductibles or self-insured retentions must be declared to and approved by SCRRRA and Member Agency. At the option of SCRRRA, either: the insurer shall reduce or eliminate such deductibles or self-insured retention's as respects SCRRRA and Member Agency, its officials and employees or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

6. Other Insurance Provisions

The General Liability and Automobile Liability policies are to contain, or be endorsed to contain, the following provisions:

- A. SCRRRA and Member Agency, its subsidiaries, officials and employees are to be covered as insured as respects: liability arising out of activities performed by or on behalf of the Contractor; premises owned, occupied or used by the Contractor, or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to SCRRRA and Member Agency, its subsidiaries, officials and employees.
- B. For any claims related to this project, the Contractor's insurance coverage shall be primary insurance as respects SCRRRA and Member Agency, its subsidiaries, officials and employees. Any insurance or self-insurance maintained by SCRRRA and Member Agency, its subsidiaries, officials and employees shall be excess of the Contractor's insurance and shall not contribute with it.

- C. Any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not effect coverage provided to SCRRA and Member Agency, its subsidiaries, officials and employees.
- D. The Contractor insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.
- E. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to SCRRA and/or Member Agency.

Course of Construction policies shall contain the following provisions:

- A. SCRRA and Member Agency shall be named as loss payee.
- B. The insurer shall waive all rights subrogation against SCRRA and Member Agency.

7. Acceptability of Insurers

Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A:VII, unless otherwise approved by SCRRA and Member Agency.

8. Verification of Coverage

Contractor shall furnish SCRRA with original endorsements effecting coverage required by this clause. The endorsements are to be signed by a person authorized by that insurer to bind coverage on its behalf. The endorsements are to be on forms provided by SCRRA. All endorsements are to be received and approved by SCRRA before work commences. As an alternative to SCRRA's forms, the Contractor's insurer may provide complete, certified copies of all required insurance policies, including endorsements effecting the coverage required by these specifications.

9. Subcontractors

Contractor shall include all subcontractors as insured under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverage for subcontractors shall be subject to all of the requirements stated herein.

10. Train Services

Approximate daily train traffic is 30 passenger trains and 20 freight trains.

11. Submittal

The original insurance policy (s) shall be submitted to:

Manager Public Projects
Southern California Regional Rail Authority (SCRRA)
700 South Flower Street, Suite 2600
Los Angeles, CA 90017-4101
Attn: Right of Way Engineer

EXHIBIT "D"
RAILROAD PROTECTIVE LIABILITY POLICY
DECLARATION

POLICY Insurance Company: Policy Number: Policy Period: From: To: 12:01am Standard time at location			
NAMED INSURED AND MAILING ADDRESS <div style="text-align: right;">Insured:</div> <div><input checked="" type="checkbox"/> Southern California Regional Rail Authority (SCRRA) 700 South Flower Street, Suite 2600 Los Angeles, CA 90017-4101</div> <div style="text-align: center;">Additionally Insured:</div> <div style="display: flex; justify-content: space-between;"><div><input checked="" type="checkbox"/> Los Angeles County Metropolitan Trans. Auto. (MTA) <input type="checkbox"/> Orange County Transportation Authority (OCTA) <input type="checkbox"/> Riverside County Transportation Commission (RCTC) <input type="checkbox"/> San Bernardino Associated Governments (SANBAG) <input type="checkbox"/> Ventura County Transportation Commission (VCTC)</div><div><input type="checkbox"/> Burlington Northern Santa Fe Corporation (BNSF) <input checked="" type="checkbox"/> Union Pacific Railroad Company (UPRR) <input checked="" type="checkbox"/> National Railroad Passenger Corporation (Amtrak) <input type="checkbox"/> Others</div></div>			
LIMITS OF INSURANCE Aggregate Limit:		Each Occurrence Limit:	
DESCRIPTION OF WORK AND JOB LOCATION(S)			
NAME AND ADDRESS OF DESIGNATED CONTRACTOR			
NAME AND ADDRESS OF INVOLVED GOVERNMENT AUTHORITY OR OTHER CONTRACTING PARTY			
PREMIUM Contract Cost Premium Base Rate per 1,000 of Advance Premium _____			
FORM OF ENDORSEMENT Title		Number	
COUNTERSIGNATURE Countersigned by _____ Date _____ (Authorized Representative)			

<p align="center">EXHIBIT 'D'</p> <p>CERTIFICATE OF INSURANCE, Southern California Regional Rail Authority (SCRRRA)</p>	
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PRODUCER

THIS CERTIFICATE OF INSURANCE IS NOT AN INSURANCE POLICY AND DOES NOT AMEND, EXTEND OR ALTER THIS COVERAGE AFFORDED BY THE POLICY BELOW.

COMPANY A
LETTER
COMPANY B
LETTER
COMPANY C
LETTER
COMPANY D
LETTER
COMPANY E
LETTER

INSURED

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENTS, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN. THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
	GENERAL LIABILITY <input type="checkbox"/> COMMERCIAL <input type="checkbox"/> GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> OCCUR. <input type="checkbox"/> OWNER'S & CONTRACTOR'S PROT. <input type="checkbox"/> OTHER _____				GENERAL AGGREGATE PRODUCTS-COMP/OP \$ AGG. \$ PERSONAL & ADV. \$ INJURY \$ EACH OCCURRENCE \$ FIRE DAMAGE (Any one fire) \$ MED. EXPENSE (Any one person) \$ COMBINED SINGLE LIMIT \$	
	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTO <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS <input type="checkbox"/> GARAGE LIABILITY				BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE EACH OCCURRENCE \$ AGGREGATE \$	
	EXCESS LIABILITY <input type="checkbox"/> UMBRELLA FORM <input type="checkbox"/> OTHER THAN UMBRELLA FORM					
	PROPERTY INSURANCE <input type="checkbox"/> COURSE OF CONSTRUCTION				AMOUNT OF INSURANCE \$	
	WORKER'S COMPENSATION AND EMPLOYER'S LIABILITY				STATUARY LIMITS \$ EACH ACCIDENT \$ DISEASE-POLICY LIMIT \$ DISEASE-EACH EMPLOYER \$	

THE FOLLOWING PROVISIONS APPLY:

1. None of the above-described policies will be cancelled, limited in scope of coverage or non renewed until after 30 days' written notice has been given to SCRRRA at the address indicated below.
2. As respects operations of the named insured performed on behalf of SCRRRA, the following are added as additional insured on all liability insurance policies listed above: SCRRRA, its Member Agencies, Operating Railroads, its subsidiaries, officials and employees.
3. It is agreed that any insurance of self-insurance maintained by SCRRRA will apply in excess of and not contribute with, the insurance described above.
4. SCRRRA is named a loss payee on the property insurance policies described above, if any.
5. All rights of subrogation under the property insurance policy listed above have been waived against SCRRRA.
6. Any failure by the insured to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to SCRRRA, its Member Agencies, its subsidiaries, officials and employees.
7. The worker's compensation insurer named above, if any, agrees to waive all rights of subrogation against SCRRRA for injuries to employees of the insured resulting from work for SCRRRA or use of Member Agencies premises or facilities.

☒ Southern California Regional Rail Authority (SCRRA)
700 South Flower Street, 26th Floor, Los Angeles, CA 90017-4101

☒ MTA ☐ OCTA ☐ RCTC
☐ SANBAG ☐ VCTC
☒ AMTRAK ☐ BNSE ☒ UPRR ☐ SPTC

SIGNATURE

TITLE

PHONE NO. _____

GENERAL SAFETY REGULATIONS FOR CONSTRUCTION MAINTENANCE ACTIVITY ON RAILWAY PROPERTY

A. GENERAL

1. Safety is of first importance in the discharge of duty.
2. These safety regulations govern your activities while on SCRRA property regardless if on or off duty.
3. Use or possession of unauthorized radio equipment is forbidden. Use of personal radios, portable tape cassette players or portable disc or record players while working is prohibited.
4. Horseplay, physical altercations, running or jumping are forbidden.
5. Firearms or other deadly weapons, including knives with a blade in excess of three inches are prohibited on SCRRA or Member Agency Property.
6. Work on public streets, roadway crossings, and highway bridges should be performed with due regard for the convenience and safety of the public.
7. All employees must look in both directions before crossing any track or roadway. Crossing tracks with equipment is prohibited unless authorized by SCRRA.
8. Only authorized employees are allowed on engines, cars caboose, track cars or other railroad equipment.

B. PERSONAL PROTECTIVE EQUIPMENT

1. All employees working on SCRRA or Member Agency Property will be required to wear the following protective equipment (except in offices or motor vehicles):
 - a. Hard hats which meet the requirements of ANSI Z89.1 or ANSI Z89.2, as specified by CAL/OSHA and/or Fed/OSHA. Metallic (metal) hard hats shall not be worn on any SCRRA project.
 - b. Eye Protection which meets the requirements of ANSI Z87.1 will be worn while on SCRRA property. Eye Protection with side shields, which meet the requirements of ANSI Z87.1 for those employees or contractors falling under 49 CFR 214. See Bridge Worker Safety Policy.
 - c. Orange Safety vests with reflective tape.
 - d. High-top leatherwork boots. Steel toe boots are required for those employees who fall under 49 CFR 214. See SCRRA Bridge worker Safety Policy.
 - e. Must use appropriate gloves when working on track or signal systems.
 - f. Grinding operations require full-face shield.

C. HOUSEKEEPING

1. Keeping premises, tools and equipment in a clean and orderly condition is essential to safety and is the responsibility of each employee.
2. Employee must be aware of areas with spilled oil or grease and apply sand or an equivalent (approved) material to minimize slipping hazards.
3. Flammable materials, caustics, acids and solvents must be stored in designated areas and in containers, which are provided for them.

4. Contractor is responsible for restoring the property to its previous condition, making repairs to fences, gates, or buildings damaged or removed by Contractor or its forces.

D. ELECTRICAL

1. Electric wires must be considered live at all times. Employee shall not depend on the insulation of wires for their safety. Employee must keep away from all overhead wires and underground wires they may come in contact with.
2. Employee must not place any metal objects across rails, which could shunt electrical circuits.

E. HAND TOOLS

1. Employees must inspect tools, machinery and equipment for defects before using.
2. Employees must use all tools and appliances in the manner intended and for the purpose designed and only those employees qualified and authorized to operate equipment and machinery can do so in the performance of duty.
3. Sharp-edge tools are to be sheathed at all times while being stored or transported.

F. ACCIDENT AND INJURY

1. When persons are injured, everything possible must be done for their care.
2. Accidents, personal injury to Employee, defects in track, bridges or signals or any unusual condition which may affect the safe and efficient operation of the SCRRA's and its Operating Railroad's operations, must be reported immediately to the Project Manager or Inspector.
3. Employees must exercise care to prevent injury to themselves or others. They must be alert and attentive at all times when performing their work and plan their work to avoid injury.
4. In case of personal injury, loss of life, or damage to property, the Foreman (Supervisor or others in charge) must immediately secure the names, addresses and occupations of all persons involved, including all persons at the scene regardless of whether these persons admit knowing anything about the accident. This information should be included in reports covering each occurrence.
5. If an accident causes personal injury or death, all tools, machinery and other equipment involved, including premises where such accident occurred, must be promptly inspected by the Foreman or by other competent inspectors. A report of such inspection, stating the conditions found and names of persons making the inspection, must be promptly forwarded to SCRRA and the supervising officer of person making the inspection.
6. Information concerning accidents or personal injuries occurring to persons who are not Employee must not be given to anyone except authorized representatives of the SCRRA or an officer of the law.

Prior to starting work, each crew will have available on site, a list of emergency phone numbers (ambulance, police, SCRRA's and/or its operating railroad's representative and the Central Control Facility) to contact if necessary.

Each crew will possess and maintain at each work site, an OSHA approved first-aid (36-unit minimum).

G. RAILROAD SAFETY FOR NON-RAILROAD EMPLOYEES

1. Foremen working on or about tracks are responsible for the safety of their crews and must guard their crews against impending danger or injury. They shall bear in mind that safety is the first and most important consideration., Foremen must have knowledge of train and engines and that protection, as required by regulation, has been furnished.
2. The Contractor must request and arrange for an inspector and/or other protective services from SCRRA authorized representative's five days before the work, for the following conditions:

- a. Protective Services for work around the railroad include form "B's" track and time and work and time. This protection can only be obtained by a qualified railroad inspector.
 - When Contractor's employee(s) and equipment(s) are within twenty (20) feet of the nearest rail.
 - When any part of any equipment is standing or being operated within or adjacent to the Property, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.
 - For any excavation below the elevation of track sub-grade if, in the opinion of SCRRA or Member Agency's representative, track or other Property may be subject to settlement or movement.
 - For clearing, grubbing, grading, or blasting proximity to the Property which, in the opinion of SCRRA or Member Agency's representative, may endanger the property or operations.
 - For street construction and maintenance activities requiring temporary work area traffic control which may affect or create unsafe conditions for employees, public, trains and vehicles.
3. SCRRA or Member Agency will furnish such employee or other protective services when, in the opinion of SCRRA's representative, the property, including but not limited to tracks, buildings, signals, wire lines or pipelines, may be endangered.
4. A job briefing (meeting among all of the employees who are involved or will be involved in particular task or job at the same work site), conforming to FRA, s regulations concerning roadway work protection, must be attended by contractor's employees before performing any task and/or any employee fouls (an individual or an equipment's in such proximity of a track that they would be struck by a moving train or on- track equipment) any track. The job briefing will include designation of an employee in charge, type of protection, limits and time of the protection, how to clear for trains and identify area of clearing.
5. Any SCRRA authorized work within twenty (20) feet of the nearest rail must be stopped, with equipment in the clear, when trains are approaching. All employees must stand back at least twenty-five (25) feet from the tracks. If it is not possible to stand 25 feet back, then employee must stand back as far as possible.
6. Movable equipment or vehicles will be:
 - operated by authorized employee only
 - operated to avoid damage to equipment or injury to occupant due to condition of route traveled account presence of concealed obstruction or holes.
 - properly secured and clear of tracks when equipment stands idle
 - parked in such a manner as not to impair vision from public roads or track right-of-way
7. Movable equipment or vehicle will not be:
 - left unattended in close proximity to railroad tracks and must be secured when left unattended
 - stored or left temporarily near a highway grade crossing in such a manner as to interfere with the sight distances of persons approaching that crossing
 - set in motion until it is known that the way is clear
 - operated in a manner to endanger life, limb or property
 - operated when safety appliance or device is missing, damaged, and inoperative or not functioning as designed

8. Equipment Operator's responsibility

- Operators of machines or equipment are charged with the responsibility of knowing that their machines are in safe, operating condition before starting, and must assure themselves that proper protection is being afforded their operations. Operator must make a running test of brakes before actual operation of work equipment.
 - When equipment is left unattended, motor must be topped, ignition must be locked, parking or hand brake must be securely set, keys must be in possession of operator or other authorized Employee, wheels must be securely blocked on grades, and equipment should be secured in highly visible area.
 - While train engine or cars are passing, brakes or other mechanism for securing rotating machinery must be used to prevent possibility of rotating parts moving; all buckets on shovels or cranes must be lowered to rest; and those without buckets must have their load line tightened to prevent movement.
 - Operators are responsible for seeing that unauthorized persons are not carried on equipment and must know that persons qualified to be on equipment are properly positioned before movement is made.
 - Operators of equipment must know the locations of overhead and underground utilities. Operator must have a clear understanding of how to protect utility lines before operating machinery..
9. Employees must not cross tracks by going underneath cars/engines or between cars coupled together.
10. Employees must not step on rails, frogs or switches and must watch their footing to avoid falling slipping or tripping. Personnel must not step on moving parts of track switches.
11. Employees must not make any move toward an approaching train with machinery that would cause the engineer to believe the track was going to be fouled.
12. Before starting work on or about the tracks, crews must have an understanding as to where they will go when necessary to clear for trains.
13. Trains are traveling faster than they appear and are relatively quiet. Moving trains are to be expected on any track at any time from either direction. Engines can push or pull a train. Employee should not rely on past experiences to determine train schedule. Train schedules are unpredictable and trains are subject to schedule change.

SECTION 14 FEDERAL REQUIREMENTS FOR FEDERAL-AID CONSTRUCTION PROJECTS

GENERAL.—The work herein proposed will be financed in whole or in part with Federal funds, and therefore all of the statutes, rules and regulations promulgated by the Federal Government and applicable to work financed in whole or in part with Federal funds will apply to such work. The "Required Contract Provisions, Federal-Aid Construction Contracts, "Form FHWA 1273, are included in this Section 14. Whenever in said required contract provisions references are made to "SHA contracting officer", "SHA resident engineer", or "authorized representative of the SHA", such references shall be construed to mean "Engineer" as defined in Section 1-1.18 of the Standard Specifications.

PERFORMANCE OF PREVIOUS CONTRACT.—In addition to the provisions in Section II, "Nondiscrimination," and Section VII, "Subletting or Assigning the Contract," of the required contract provisions, the Contractor shall comply with the following:

The bidder shall execute the CERTIFICATION WITH REGARD TO THE PERFORMANCE OF PREVIOUS CONTRACTS OR SUBCONTRACTS SUBJECT TO THE EQUAL OPPORTUNITY CLAUSE AND THE FILING OF REQUIRED REPORTS located in the proposal. No request for subletting or assigning any portion of the contract in excess of \$10,000 will be considered under the provisions of Section VII of the required contract provisions unless such request is accompanied by the CERTIFICATION referred to above, executed by the proposed subcontractor.

NON-COLLUSION PROVISION.—The provisions in this section are applicable to all contracts except contracts for Federal Aid Secondary projects.

Title 23, United States Code, Section 112, requires as a condition precedent to approval by the Federal Highway Administrator of the contract for this work that each bidder file a sworn statement executed by, or on behalf of, the person, firm, association, or corporation to whom such contract is to be awarded, certifying that such person, firm, association, or corporation has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the submitted bid. A form to make the non-collusion affidavit statement required by Section 112 as a certification under penalty of perjury rather than as a sworn statement as permitted by 28, USC, Sec. 1746, is included in the proposal.

PARTICIPATION BY MINORITY BUSINESS ENTERPRISES IN SUBCONTRACTING.—Part 23, Title 49, Code of Federal Regulations applies to this Federal-aid project. Pertinent sections of said Code are incorporated in part or in its entirety within other sections of these special provisions.

Schedule B—Information for Determining Joint Venture Eligibility

(This form need not be filled in if all joint venture firms are minority owned.)

1. Name of joint venture _____
2. Address of joint venture _____
3. Phone number of joint venture _____
4. Identify the firms which comprise the joint venture. (The MBE partner must complete Schedule A.) _____

 - a. Describe the role of the MBE firm in the joint venture. _____
 - b. Describe very briefly the experience and business qualifications of each non-MBE joint venturer: _____

5. Nature of the joint venture's business _____
6. Provide a copy of the joint venture agreement.
7. What is the claimed percentage of MBE ownership? _____
8. Ownership of joint venture: (This need not be filled in if described in the joint venture agreement, provided by question 6.).
 - a. Profit and loss sharing.
 - b. Capital contributions, including equipment.
 - c. Other applicable ownership interests.

9. Control of and participation in this contract. Identify by name, race, sex, and "firm" those individuals (and their titles) who are responsible for day-to-day management and policy decision making, including, but not limited to, those with prime responsibility for:

a. Financial decisions _____

b. Management decisions, such as:

(1) Estimating _____

(2). Marketing and sales _____

(3). Hiring and firing of management personnel _____

(4) Purchasing of major items or supplies _____

c. Supervision of field operations _____

Note.—If, after filing this Schedule B and before the completion of the joint venture's work on the contract covered by this regulation, there is any significant change in the information submitted, the joint venture must inform the grantee, either directly or through the prime contractor if the joint venture is a subcontractor.

Affidavit

"The undersigned swear that the foregoing statements are correct and include all material information necessary to identify and explain the terms and operation of our joint venture and the intended participation by each joint venturer in the undertaking. Further, the undersigned covenant and agree to provide to grantee current, complete and accurate information regarding actual joint venture work and the payment therefor and any proposed changes in any of the joint venture arrangements and to permit the audit and examination of the books, records and files of the joint venture, or those of each joint venturer relevant to the joint venture, by authorized representatives of the grantee or the Federal funding agency. Any material misrepresentation will be grounds for terminating any contract which may be awarded and for initiating action under Federal or State laws concerning false statements."

_____ Name of Firm	_____ Name of Firm
_____ Signature	_____ Signature
_____ Name	_____ Name
_____ Title	_____ Title
_____ Date	_____ Date

Date _____

State of _____

County of _____

On this ____ day of _____, 19 __, before me appeared (Name) _____, to me personally known, who, being duly sworn, did execute the foregoing affidavit, and did state that he or she was properly authorized by (Name of firm) _____ to execute the affidavit and did so as his or her free act and deed.

Notary Public _____

Commission expires _____

[Seal]

Date _____

State of _____

County of _____

On this ____ day of _____, 19 __, before me appeared (Name) _____ to me personally known, who, being duly sworn, did execute the foregoing affidavit, and did state that he or she was properly authorized by (Name of firm) _____ to execute the affidavit and did so as his or her free act and deed.

Notary Public _____

Commission expires _____

[Seal]

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

I. GENERAL

1. These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.
2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.
3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.
4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;

Section IV, paragraphs 1, 2, 3, 4, and 7;

Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.
6. **Selection of Labor:** During the performance of this contract, the contractor shall not:
 - a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or
 - b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:
 - a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.
 - b. The contractor will accept as his operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall

include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.
3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:
 - a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.
 - b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.
 - c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.
 - d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
 - e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.
4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.
 - a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.
 - b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)
 - c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.
5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:
 - a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

- b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
 - c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
 - d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.
6. Training and Promotion:
- a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.
 - b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.
 - c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
 - d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.
7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:
- a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.
 - b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.
 - c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA and shall set forth what efforts have been made to obtain such information.
 - d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

8. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.
- a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.
 - b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.
 - c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.
9. **Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.
- a. The records kept by the contractor shall document the following:
 - (1) The number of minority and non-minority group members and women employed in each work classification on the project;
 - (2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;
 - (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and
 - (4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.
 - b. The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.

III. NONSEGREGATED FACILITIES

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

- a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.
- b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

- c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of \$10,000 or more and that it will retain such certifications in its files.

IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. General:

- a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3)] issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c) the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.
- b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.
- c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. Classification:

- a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.
- b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:
 - (1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;
 - (2) the additional classification is utilized in the area by the construction industry;
 - (3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and
 - (4) with respect to helpers, when such a classification prevails in the area in which the work is performed.
- c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized

representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

- d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary
- e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. Payment of Fringe Benefits:

- a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.
- b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

4. Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:

- a. Apprentices:
 - (1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.
 - (2) The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

- (3) Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.
- (4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

- (1) Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.
- (2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.
- (3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.
- (4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Helpers:

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under an approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. Apprentices and Trainees (Programs of the U.S. DOT):

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

6. Withholding:

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

7. Overtime Requirements:

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. Violation:

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of \$10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. Withholding for Unpaid Wages and Liquidated Damages:

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

V. STATEMENTS AND PAYROLLS

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. Compliance with Copeland Regulations (29 CFR 3):

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. Payrolls and Payroll Records:

- a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.
- b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or

does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

- c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.
- d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
 - (1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;
 - (2) that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;
 - (3) that each laborer or mechanic has been paid not less than the applicable wage rate and fringe benefits or cash equivalent for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.
- f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.
- g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

- 1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than \$1,000,000 (23 CFR 635) the contractor shall:

- a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.
 - b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.
 - c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.
2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

VII. SUBLETTING OR ASSIGNING THE CONTRACT

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635).
 - a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.
 - b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.
2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.
3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.
4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

VIII. SAFETY: ACCIDENT PREVENTION

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.
2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the

Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

Notice To All Personnel Engaged On Federal-Aid Highway Projects

18 U.S.C. 1020 READS AS FOLLOWS:

"Whoever being an officer, agent, or employee of the United States, or any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined not more than \$10,000 or imprisoned not more than 5 years or both."

X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$100,000 or more.)

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.
2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.
3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

1. Instructions for Certification - Primary Covered Transactions:

(Applicable to all Federal-aid contracts - 49 CFR 29)

- a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
- c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.
- d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.
- f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
- g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
- h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.
- i. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

- j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion — Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:
 - a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
 - b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 - c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and
 - d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Covered Transactions:

(Applicable to all subcontracts, purchase orders and other lower tier transactions of \$25,000 or more - 49 CFR 29)

- a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.
- b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
- c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.
- d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
- e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
- f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

- g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
- h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion — Lower Tier Covered Transactions

- 1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
- 2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 - 49 CFR 20)

- 1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:
 - a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
 - b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- 2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.
- 3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

FEDERAL-AID FEMALE AND MINORITY GOALS

In accordance with Section II, "Nondiscrimination," of "Required Contract Provisions Federal-aid Construction Contracts" the following are the goals for female utilization:

Goal for Women (applies nationwide).....(percent)	6.9
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The following are goals for minority utilization:

CALIFORNIA ECONOMIC AREA

		Goal (Percent)
174	Redding, CA:	
	Non-SMSA Counties	6.8
	CA Lassen; CA Modoc; CA Plumas; CA Shasta; CA Siskiyou; CA Tehama.	
175	Eureka, CA	
	Non-SMSA Counties	6.6
	CA Del Norte; CA Humboldt; CA Trinity.	
176	San Francisco-Oakland-San Jose, CA:	
	SMSA Counties:	
	7120 Salinas-Seaside-Monterey, CA	28.9
	CA Monterey.	
	7360 San Francisco-Oakland	25.6
	CA Alameda; CA Contra Costa; CA Marin; CA San Francisco; CA San Mateo.	
	7400 San Jose, CA	19.6
	CA Santa Clara.	
	7485 Santa Cruz, CA.	14.9
	CA Santa Cruz.	
	7500 Santa Rosa, CA	9.1
	CA Sonoma.	
	8720 Vallejo-Fairfield- Napa, CA	17.1
	CA Napa; CA Solano	
	Non-SMSA Counties	23.2
	CA Lake; CA Mendocino; CA San Benito	
177	Sacramento, CA:	
	SMSA Counties:	
	6920 Sacramento, CA	16.1
	CA Placer; CA Sacramento; CA Yolo.	
	Non-SMSA Counties	14.3
	CA Butte; CA Colusa; CA El Dorado; CA Glenn; CA Nevada; CA Sierra; CA Sutter; CA Yuba.	
178	Stockton-Modesto, CA:	
	SMSA Counties:	
	5170 Modesto, CA	12.3
	CA Stanislaus.	
	8120 Stockton, CA	24.3
	CA San Joaquin.	
	Non-SMSA Counties	19.8
	CA Alpine; CA Amador; CA Calaveras; CA Mariposa; CA Merced; CA Tuolumne.	

		Goal (Percent)
179	Fresno-Bakersfield, CA	
	SMSA Counties:	
	0680 Bakersfield, CA	19.1
	CA Kern.	
	2840 Fresno, CA	26.1
	CA Fresno.	
	Non-SMSA Counties	23.6
	CA Kings; CA Madera; CA Tulare.	
180	Los Angeles, CA:	
	SMSA Counties:	
	0360 Anaheim-Santa Ana-Garden Grove, CA	11.9
	CA Orange.	
	4480 Los Angeles-Long Beach, CA	28.3
	CA Los Angeles.	
	6000 Oxnard-Simi Valley-Ventura, CA	21.5
	CA Ventura.	
	6780 Riverside-San Bernardino-Ontario, CA.	19.0
	CA Riverside; CA San Bernardino.	
	7480 Santa Barbara-Santa Maria-Lompoc, CA	19.7
	CA Santa Barbara.	
	Non-SMSA Counties	24.6
	CA Inyo; CA Mono; CA San Luis Obispo.	
181	San Diego, CA:	
	SMSA Counties	
	7320 San Diego, CA.	16.9
	CA San Diego.	
	Non-SMSA Counties	18.2
	CA Imperial.	

In addition to the reporting requirements set forth elsewhere in this contract the Contractor and subcontractors holding subcontracts, not including material suppliers, of \$10,000 or more, shall submit for every month of July during which work is performed, employment data as contained under Form FHWA PR-1391 (Appendix C to 23 CFR, Part 230), and in accordance with the instructions included thereon.

FEDERAL REQUIREMENT TRAINING SPECIAL PROVISIONS

As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide on-the-job training to develop full journeymen in the types of trades or job classification involved.

The goal for the number of trainees or apprentices to be trained under the requirements of this special provision will be 20.

In the event the Contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees or apprentices are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The Contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of trainees or apprentices in each occupation shall be in their first year of apprenticeship or training.

The number of trainees or apprentices shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing work, the Contractor shall submit to the Department for approval the number of trainees or apprentices to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee or apprentice employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees or apprentices as provided hereinafter.

Training and upgrading of minorities and women toward journeymen status is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make every effort to enroll minority and women trainees or apprentices (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees or apprentices) to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee or apprentice in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The Contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by both the Department and the Federal Highway Administration. The Department and the Federal Highway Administration will approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee or apprentice for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with the State of California, Department of Industrial Relations, Division of Apprenticeship Standards recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the Contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the Engineer, reimbursement will be made for training of persons in excess of the number specified herein. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the Contractor where he does one or more of the following and the trainees or apprentices are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or apprentice or pays the trainee's or apprentice's wages during the offsite training period.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee or apprentice as a journeyman, is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirements of this Training Special Provision. It is normally expected that a trainee or apprentice will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program. It is not required that all trainees or apprentices be on board for the entire length of the contract. A Contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees or apprentices specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Only trainees or apprentices registered in a program approved by the State of California's State Administrator of Apprenticeship may be employed on the project and said trainees or apprentices shall be paid the standard wage specified under the regulations of the craft or trade at which they are employed.

The Contractor shall furnish the trainee or apprentice a copy of the program he will follow in providing the training. The Contractor shall provide each trainee or apprentice with a certification showing the type and length of training satisfactorily completed.

The Contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.